Canada. Royal commission on Farm machinery
[Brief]
Massey-Ferguson Industries Ltd
1968

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SUMMARY

FOREWORD

Massey-Ferguson Industries Limited is pleased to submit a brief to the Royal Commission on farm machinery. The company hopes that the Commission's work will bring benefits to the farmer, the independent farm machinery dealers, the industry and the nation in general.

Massey-Ferguson's desire and determination to assist and cooperate with the Commission is, the company feels, reflected in the nature of this submission. Above all, it attempts to answer the questions of the Commission in a detailed and comprehensive way. When, in some matters the company did not have the answers, and could not obtain them itself, it has retained outside consultants to provide them.

While the company has tried to answer the questions asked by the Commission, MF has actually gone well beyond providing limited answers. Wherever it seemed relevant MF has raised certain additional aspects and provided information that the Commission did not specifically request. The tendency of the company, and quite deliberately so, has been to err on the side of providing more, not less, information, and this has been because MF thought the Commission would want it so. Also the company has attempted to present that information in relatively precise analytical terms wherever this approach seemed to be possible.

Massey-Ferguson does not intend to summarize its brief in this introductory chapter (see chapter XII). Several points may, however, be made.

Massey-Ferguson Industries Limited was established in 1964 as the Canadian operating subsidiary of Massey-Ferguson Limited. Massey-Ferguson Limited (or its predecessor companies) is a Canadian company with a 120-year tradition of serving Canadian farmers and meeting their machinery needs. It has ventured abroad and now is an international corporation. Its experience tells it that in order to survive in the industry --an industry which it has found to be very competitive in nature-- it must seek improvements in efficiency, in plant location, and in return on assets employed wherever it can. The only way Massey-Ferguson can do this is to develop its strategy on a worldwide basis.

The company believes it has, and is, serving Canadian farmers and Canada in general very well. MF's goal has always been to manufacture quality products, sell them at a reasonable price and help to provide the farmers with the services he needs. In so doing, Massey-Ferguson also brings to the farmers the benefits of its worldwide farm machinery technology, not just that developed in the company's research facilities located in Canada. It brings them the economies involved in sourcing machines and components from countries of lowest cost.

It has tended to locate its major North American labor intensive operations in Canada and has built up a strong export market in the United States for its Canadian plants. Consequently its employment of Canadian workers is greater than would be suggested by its Canadian sales. Through strenuous efforts to continuously improve the efficiency of its operations in Canada, it has attempted to ensure that economic considerations will permit such a pattern to be perpetuated.

Massey-Ferguson's attempts at improving efficiency have extended well beyond manufacturing activity. MF believes that its parts service, its financing facilities, its general service to dealers, and its attempts at determining what the farmer wants and needs have all developed in an exceedingly satisfactory way.

Massey-Ferguson, like everyone else, has faced increasing costs and these costs lie behind the rising levels of farm machinery prices. This rising price level is an unfortunate trend. It does not make life easy for this company or the industry of which it is a part. MF, however, does believe that through its efforts to increase efficiency and keep costs down MF has made some contribution to minimizing the extent of the price increases.

The Canadian farm machinery industry has repeatedly, since the 1930's, been the subject of official investigations. The diversion of company

executives' time in cooperation with these investigations has been disruptive and expensive. For this and other reasons, Massey-Ferguson fully shares the Commissioner's hope that the current Commission will provide the basis for settling long-standing questions relating to the industrial segment of the agricultural community. It is the company's anticipation that this Royal Commission will put such questions to rest.

Toronto

October 6, 1967.

Chapter II

WORLDWIDE STRUCTURE

An understanding of the operations of Massey-Ferguson Industries Limited requires a discussion of the legal structure of the worldwide enterprise of the parent company, Massey-Ferguson Limited. Such an understanding also requires a discussion of the functional structure of the parent company and its worldwide operations. These legal and functional structures form the framework for Massey-Ferguson Industries Limited's day-to-day operations in the competitive farm machinery market in Canada; for the functional structure -- through which management decisions are coordinated, communicated and executed within MF in 166 countries and territories -- of necessity has its foundation in legal entities, i.e., corporate bodies.

These companies, in various countries, enable the worldwide functional structure to accommodate itself to the legal requirements and political realities of doing business. In each of their respective national environments, these companies facilitate the external coordination necessary with respect to purchasing, tariffs, taxation, transportation and other administrative matters.

II

LEGAL AND FUNCTIONAL STRUCTURE

Legal structure refers to the channels of ownership through which Massey-Ferguson Limited, the parent company, controls subsidiary companies, directly or indirectly, through total or majority equity ownership. Legal structure also refers to those channels through which the parent company participates financially in other companies, which manufacture and/or market Massey-Ferguson products or Perkins engines, but in which Massey-Ferguson Limited has only a minority equity interest. These latter legal entities are known within MF as "associated companies".

It is the legal structure of both subsidiary and associated companies that provides the basis for the parent company's legal rights and obligations.

In addition to the MF legal structure, there exists the MF functional structure. Functional structure refers to all or any of its geographically defined "operations units", and their sub-divisions such as departments, established to coordinate the operation of the subsidiary companies.

These functional management elements -- or "operations units" -- which have been established to coordinate the operations of geographically dispersed manufacturing and marketing subsidiaries are located in Australia, Brazil, France, Germany, Italy, North America (two),South Africa and the United Kingdom.

A general manager of an operations unit, depending on the nature of machinery with which he is concerned, reports to one of three group vice presidents at the parent company: group vice president-farm machinery, industrial and construction machinery, or engines. The operations unit general manager is responsible for the production and marketing of MF products in those areas, indicated above, where MF owns manufacturing facilities. These facilities are assigned to the general manager's largely self-contained operations unit.

In addition to the geographical operations units, an export operations unit serves areas of the globe not covered by the geographical operations units; and a special operations unit investigates manufacturing and assembly possibilities -- and may undertake their basic development -- in areas where MF previously has not had them. These export and special operations units, both of which are organizational elements of the parent company, are explained in more detail later in this chapter.

Worldwide Group of Massey-Ferguson Companies

Massey-Ferguson Limited has total or major equity interest in 41 active subsidiary companies and a minority equity interest in five

associated companies. The 46 companies are located in 19 countries or possessions: Argentina, Australia, Brazil, Canada, Eire, France, Germany, India, Italy, Mexico, Morocco, the Netherlands Antilles, Panama, South Africa, Spain, Switzerland, Rhodesia, the United Kingdom (England and Scotland) and the United States.

The five associated companies are located one each in India, Morocco, Spain, Argentina and Mexico. In both Argentina and Mexico, Massey-Ferguson Limited also has a subsidiary company.

Operations units' management do not, of course, operate the associated companies. The chief executive officer of an associated company is responsible to his own board of directors, on which MF usually will be represented.

Of the 41 subsidiary companies, 29 are concerned with the manufacture, marketing or financing of MF's agricultural and/or industrial construction machinery; two are furniture companies, and the remaining 10 are concerned with the manufacture and/or marketing of diesel engines.

Within North America, in addition to Massey-Ferguson Limited itself, there are 10 active direct or indirect subsidiary companies of Massey-Ferguson Limited. Four of these are in the United States and six are in Canada. Of these six in Canada, one is an engine company, one is a finance company, two are furniture companies, and two are concerned with farm machinery manufacture and/or marketing.

Of these latter two, one is Massey-Ferguson Industries Limited, the principal Canadian subsidiary, with head offices at 915 King Street West, Toronto; the other is Massey-Ferguson Brantford Limited. A single group of executives runs all MF farm machinery operations in North America. Many of these executives are directors or officers of the companies which furnish the legal basis for their operations.

MASSEY-FERGUSON LIMITED MANAGEMENT ORGANIZATION

Against the background of the legal and functional structure of the MF group of companies, one should next describe the parent company's organizational structure which provides the managerial leadership for MF's worldwide enterprise.

This leadership is exercised through global strategies, policies and management principles that MF provides to its subsidiary and associated companies. The responsibility for running these subsidiary companies belongs to the general managers of the operations units and includes (1) maintaining high standards of product quality and of service to dealers and their customers, and (2) contributing a profit to the parent company.

Operational Patterns and Objectives

Facilitating MF's Worldwide Enterprise

To achieve these goals, for which the various operations units'

general managers and their product group vice presidents are responsible, MF has evolved operational patterns and objectives. They are the desired end of virtually every engineering and manufacturing action the company takes. Over the last decade, they have served as MF's practical catechism. They are responsible for the success the company has achieved in the intensely competitive international farm machinery industry.

The following passages describe in general terms the nature of these operating patterns and objectives. Their importance will become apparent to the Commission as it studies this brief and sees the achievement wrought through their implementation.

Decentralized marketing and manufacturing: MF has 37 manufacturing sites in 10 countries and it markets its products in 166 countries and territories. This decentralization permits optimization of manufacturing mix among the different countries to maximize advantages and minimize disadvantages. It also permits fast response to local market conditions plus identification of the company with the local agricultural community whose needs it serves.

Component commonality and resultant interchangeability: in simplest terms, this means that MF machine components for like machines are standardized regardless of where the machine or its components are produced. A tractor produced in France, for instance, would contain many components identical or effectively identical with those in a

like tractor produced in North America.

The word "commonality", as used in MF, does not exist in dictionaries. Its meaning encompasses more than the fact that components may be made in MF plants from the same master blueprint, or that a single plant may supply the needs of the entire manufacturing complex for certain parts. Commonality results from the steps MF takes to ensure that a particular component will be compatible with the company's marketing, engineering and manufacturing dictates around the world.

The essential consequences of commonality are: (1) the physical interchangeability of parts between like machines regardless of their site of manufacture; (2) the cost savings generated through common design and integrated manufacturing, and (3) the flexibility derived from the first two points. This is a flexibility which can be exercised in response to national and international political and economic disruptions. It enables MF to establish or continue manufacturing in more stable areas, thereby satisfying the needs of its dealers and their customers.

<u>Optimum internal manufacture</u>: MF has long believed that it could not compete successfully as a worldwide enterprise without controlling a high percentage of its component sourcing. Internal manufacture enhances MF's ability to achieve component interchangeability through

the company's direct control of component design. Optimum internal manufacture reduces or eliminates the costs of providing a profit to an outside manufacturer, of meeting his marketing expenses and paying associated transportation costs that would probably be higher than MF's.

It should be emphasized that neither component interchangeability nor maximum internal manufacture are 100 percent necessary or desirable. Nor, in all probability, are they practicable. MF attempts to implement them, generally speaking, to the point of optimum economic advantage.

Centralized direction of product line strategy, design, location of manufacturing facilities and allocation of money. Centralized direction is not an operating objective in itself, but MF considers it necessary for the coordination of its decentralized-but-integrated manufacturing and marketing complex in which it attempts to manifest its operating objectives.

Management Principles

Massey-Ferguson's organization and modus operandi are based on a set of management principles. These principles define or deal with responsibility, delegation of authority, accountability, control, policies, committees, staff work and courtesy.

Four of these which have proved their usefulness in the development of the parent company until now are considered of fundamental and continuing importance:

- responsibility must be set out as explicitly as possible;

- authority delegated must match the responsibility;

- an executive is accountable for the results achieved with authority delegated to him; if he chooses to delegate a portion of his responsibility and authority to his subordinates, this does not lessen his accountability;

- responsibility and authority that have been delegated must be subject to supervision and control.

Organizational Principles

Historically, the principles and form of the present organization stem from a memorandum on organization, and a management organization plan, written and issued by the Canadian businessman, the late Lieut. Col. W. E. Phillips, chairman and chief executive officer in 1956, at the time of the company's change of management.

They read:

> "Whenever a group of more than two persons join together in an effort to achieve a common objective, some degree of organization must be involved. When the group is small, undoubtedly there is merely some subconscious agreement as to the division of labor but, nevertheless, the concept of organization is involved, even if it be in a primitive sense. As the group increases in numbers, it usually follows that consideration is given to a more formal record of agreement between the persons involved as to the division of labor and authority. Considering the state of our industrial society of some 25 years ago, I am sure that what were then regarded as substantial industrial enterprises conducted their business satisfactorily with the minimum of formal organization.
>
> "The complicated conditions affecting all business today render it not only impossible to expect satisfactory operation, lacking a clean plan of management organization, but indeed render it foolish to expect success without it.

"I am satisfied that the question of organization must be brought to the attention of all those who are concerned with the successful operation of Massey-Harris-Ferguson Limited. We are gradually developing new and positive policies, both long- and short-term. These policies determine the methods to be used in achieving our objectives. These policies require, if they are to be successfully applied, constant and effective supervision and control.

"In the following pages, I have attempted to set out in simple language the fundamental principles which will provide the basis of our Management Organization Plan. I urge you to study them, to ask any questions which may come to mind, and to use them as a basis for the development of your own detailed Management Organization Plan.

"As we become more practised in the use of the new Management Organization Plan, there will be a need for a greater degree of decentralization within our worldwide organization. Any such decentralization will depend upon the proof that the individual

executives concerned are able to discharge successfully their respective responsibilities.

"Spread as we are across the world, it becomes more than ever important that the procedures which establish the methods which are to be used in the conduct of our business shall be, as far as possible, common throughout the whole organization. We are now committed to present our annual statement in the form of a Consolidated Balance Sheet covering the worldwide operations of the company, and this consideration alone must override certain local conditions which now prevail; we must direct that common procedures are to be the rule.

"Progress towards the ideal goal of common procedures will, to a large extent, govern the degree of possible decentralization. It should do much to eliminate certain problems which now exist and tend towards the simplification of day-to-day routine. On two occasions in the past few months, when discussing the question of decentralization, I have used the word "autonomy". Apparently some misinterpret what I mean by "autonomy". I do not mean self-sovereignty in any sense. I intend to imply that decentralization, subject to effective

control, should bring with it the freedom to make the correct decisions. It certainly is not a license to make any haphazard decisions. All the decisions so made must fall within the limits of the budget, which is authorized for all divisions by head office.

"Do not forget that the best executives are those who make "paper" their servant, not their master.

Management Organization Plan

"The successful operation of any industrial enterprise depends primarily upon the quality of the men who constitute the company.

"It is clearly not possible to operate Massey-Harris-Ferguson as a monarchy, subject to the executive decisions of any individual at head office.

"It is intended that the company shall be operated by a TEAM and that executive authority shall be decentralized to the extent that it may be practical.

"The rules of the game within which this TEAM will operate are, in effect, laid down by the MANAGEMENT ORGANIZATION PLAN.

"The satisfactory operation of the MANAGEMENT ORGANIZATION PLAN depends entirely upon the successful delegation of RESPONSIBILITY and AUTHORITY and, above all, its CONTINUOUS SUPERVISION AND CONTROL.

"The delegation of responsibility within the MANAGEMENT ORGANIZATION PLAN must follow simple but fundamental principles:

1. The delegation of RESPONSIBILITY must be set out in explicit terms.

2. The AUTHORITY delegated must in every respect match the responsibility.

3. The operation of the RESPONSIBILITY AND AUTHORITY so delegated must be subject to continuous supervision and control.

4. The fact that RESPONSIBILITY has been delegated does not in any way lessen the accountability of the executive who delegates.

"Within the structure of the MANAGEMENT ORGANIZATION PLAN, two types of authority are subject to delegation:

LINE AUTHORITY: The chain of responsibility, perhaps best indicated by the organization chart, determines the flow of executive directives from the Chief Executive Officer downwards to the head of the smallest department. Executive action may be initiated only through this line authority structure.

STAFF AUTHORITY: As the complexity of management function increases, the need for STAFF EXECUTIVES to handle certain of them must be recognized.

"In general, the functions of the staff executive relate to investigation, interpretation, information, advice and coordination. In his capacity as a staff executive he is NOT responsible for the execution of any line authority functions.

"The leadership to be exercised by the staff executive is essentially one of ideas based on his specialized ability, knowledge and experience. In reality, the staff executive supplements and extends the competence of the line executive. Broadly speaking, every line executive is entitled to expect, and if necessary to request, the services of the appropriate staff executive, but the important principle involved is that the staff executive in that capacity HAS NO AUTHORITY

TO ISSUE EXECUTIVE ORDERS TO ANY LINE EXECUTIVE. The LINE EXECUTIVE is not compelled to accept even good advice from the staff executive, but it would be most unfortunate if he did otherwise, because the entire responsibility for error would fall on him. On the other hand, the staff executive is bound to give good advice and it would be most unfortunate if the advice were otherwise.

"It is, of course, expected that many executives whose appointment in certain areas is of a staff nature, will, within their own departments, or in specified areas, function as LINE EXECUTIVES.

"In a worldwide organization, such as ours, engineering and administrative functions are constantly intermingled and the vital flow of ADVICE and GUIDANCE, particularly in the field of the engineering function, is to be exercised within the structure of the staff authority.

"I would place as the first essential to the smooth working of any MANAGEMENT ORGANIZATION PLAN that priceless ingredient: GOODWILL.

"Next, and equally important, is a clear understanding of our MANAGEMENT ORGANIZATION PLAN and its avowed objectives. To ensure that the details concerning the delegation of responsibility are known to all concerned, use is made of:

- A GENERAL ORGANIZATION CHART in graphic form;

- A SCHEDULE OF RESPONSIBILITY set forth in explicit form.

"The graphic organization chart corresponds to what might be described as a 'general assembly drawing'; the schedule of responsibilities corresponds to a set of 'engineering specifications'. They must be read together.

"The 'committee' provides a most useful instrument for management purposes, but it is important that the inherent limitations which attach to any committee be clearly recognized.

"The committee even at its best is a poor substitute for an effective MANAGEMENT ORGANIZATION PLAN. It

is an ideal vehicle when used as a means of consultation and review but it cannot of itself function as a vehicle of EXECUTIVE RESPONSIBILITY.

"The responsibility for executive action arising out of the proceedings of any committee must be vested in the chairman of the committee, or the appropriate executive to whom the committee reports.

"Once the MANAGEMENT ORGANIZATION PLAN has been established, it cannot be changed in any respect other than by the recommendation of the COMMITTEE ON ORGANIZATION AND PROCEDURES.

"This is not to suggest that the established plan will not need change. I am certain that many changes will be desirable but such changes CANNOT be made at the will of ANY ONE INDIVIDUAL.

"The COMMITTEE ON ORGANIZATION AND PROCEDURES is charged with the issue of the details of the MANAGEMENT ORGANIZATION PLAN and the PROCEDURES which set out the methods and practices which are to be followed in the day-to-day administration

of the company and all subsidiaries and divisions. Such directives relating to organization and procedure and all changes and alterations will be issued within the authority of the president and in such manner as he may decide."

Organization for Worldwide Operations

By 1959, the parent company had established a worldwide organizational structure consisting of geographical operations units and subsidiary companies responsible for the success of activities in their areas. These operations units were backed up by a parent company staff with worldwide responsibilities. The total organization operated under these basic concepts:

- decentralization of marketing and manufacturing to ensure fast local response to local market needs and competition;

- centralized direction of product line strategy and design, location of facilities, allocation of money and decisions related to flow of trade;

- strong support for the president from a parent company staff group of functional specialists in developing worldwide strategies;

- active participation by the president both in strategy development and in the details of strategy implementation.

New Challenges to Worldwide Operations

But after 1959, fundamental changes, both internal and external placed new demands on the organization. Since then, Massey-Ferguson Limited has continued to evolve into a multi-product enterprise. Instead of concentrating almost exclusively on farm machinery manufacture, the company has expanded its industrial and construction machinery line, entered the lawn and garden equipment market, acquired a worldwide diesel engine business and, through an associated company, entered the truck or vehicle field. With these expansions MF's operations have increased in size and diversity.

The problems of size, diversity and complexity were compounded by technological developments and new product introduction throughout the farm machinery industry.

In addition, changes were occurring in the market characteristics of MF's customers. In developed countries, the farmer was becoming a more sophisticated buyer who makes his equipment decisions on a business basis, examining critically what each manufacturer has to offer in specific features, price, credit, and service support.

The company's competitors were also increasing the level of their managerial competence. A new generation of executives was beginning to replace old-line management in the farm machinery industry. These new managers were applying some of the most advanced techniques available. Equally significant, they were, with varying degrees of success, beginning to adopt the approach to worldwide organization implemented by MF. Several competitors were moving to "internationalize" their operations, thus intensifying competition on a global scale.

These developments did not lessen the need for decentralization of marketing and manufacturing or for central direction of some key functions. Indeed, they reinforced it. However, these developments created some difficult problems for a management structured on the 1959 basis. For example:

- without concentrated individual leadership and specific direction, the non-agricultural product lines tended to become subordinated to, or buried under, the farm machinery business. New product businesses cannot grow unless each is managed in a way that concentrates major attention on its critical activities, particularly marketing and product line development;

- the increase in the number of operations units made it difficult for one individual, the president, to maintain personal contact with details of all operations units and still provide strategic leadership for the total company;

- because of MF's expanding size and diversity, the decision-making process was in danger of being slowed to an unacceptable pace;

- the increasingly dynamic and competitive nature of the farm machinery industry was causing MF to devote more and more attention to identifying major threats and opportunities and to determining what to do about them. Major emphasis had to be placed on establishing strategic plans and policies designed to keep the company in the forefront of change.

Establishment of Worldwide Product Groups

For these reasons, in 1966, the president of Massey-Ferguson Limited acted to concentrate his primary attention on developing long-range strategies and policies and on coordinating worldwide activities, leaving operating problems to his senior executives.

To adapt itself to the above challenges and to improve further the company's market position, in November 1966, MF embraced these organizational concepts:

- dividing operations into worldwide product groups, one each for farm machinery, engines and industrial and construction machinery. Each product group is headed by a group vice president with worldwide responsibilities. He provides the leadership and direction for his own product group. He also frees the president from involvement in the details of strategy implementation;

- focusing staff activities more on strategic planning and policy formulation. This accelerates completion of staff work which forms the basis for major strategy or policy decisions. The parent company staff directs its primary efforts to identifying opportunities for major change and improvement throughout the world. In addition, parent company staff activities include much coordination between the three product groups.

At the same time, MF continues, as under the 1959 organization,

to decentralize marketing and manufacturing. Operations unit management is still responsible for decisions intended to capitalize on local opportunities to increase sales volume, reduce manufacturing costs and raise operating efficiency. The parent company continues to maintain centralized direction of product line strategy and design, location of facilities, allocation of money and decisions related to the flow of trade.

Massey-Ferguson Limited's Major Organizational Elements

The present management structure (see chart) of the parent company reflects the concepts just reviewed. In brief, that structure consists of the following major elements:

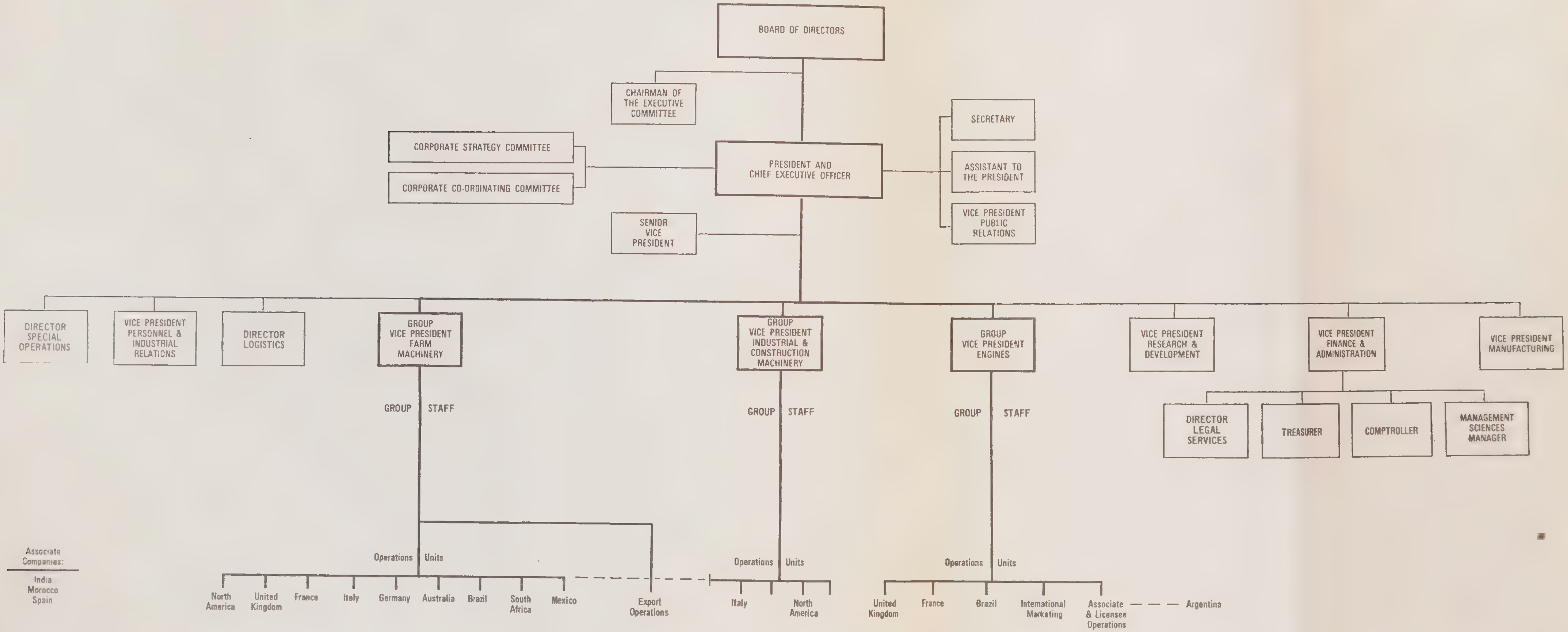
- president and chief executive officer and the staff attached to his office;

- group vice presidents, each of whom heads up a worldwide product group and acts as an extension of the office of the president in exercising overall line authority for his own group;

- group staffs which deal with the product market needs unique to each product group;

Massey-Ferguson Limited

WORLD-WIDE MANAGEMENT ORGANIZATION



- general staff, whose strategic planning, policy formulation and operational coordination encompass subjects common to all three groups;

- operations units, which are the functional and largely self-contained operational entities in each geographical area where the company has manufacturing facilities.

One should note the staff and line distinctions among these various elements. Line authority begins with the president and flows from him to the group vice presidents with respect to their product groups. From these group vice presidents, authority and responsibility pass to the general managers of the respective operations units.

Staff responsibility at the parent company is held by (1) the group staffs of the various product groups with respect to the activities of the individual product group, and (2) the general staff, with respect to the staff needs of the parent company as a whole.

The structure of the farm machinery group is of prime interest for purposes of this brief. The brief will, however, also touch on the activities of the general staff, the operations units, the

export operations unit and the special operations unit, and one of the concluding chapters will deal, in some depth, with the industrial and construction machinery group.

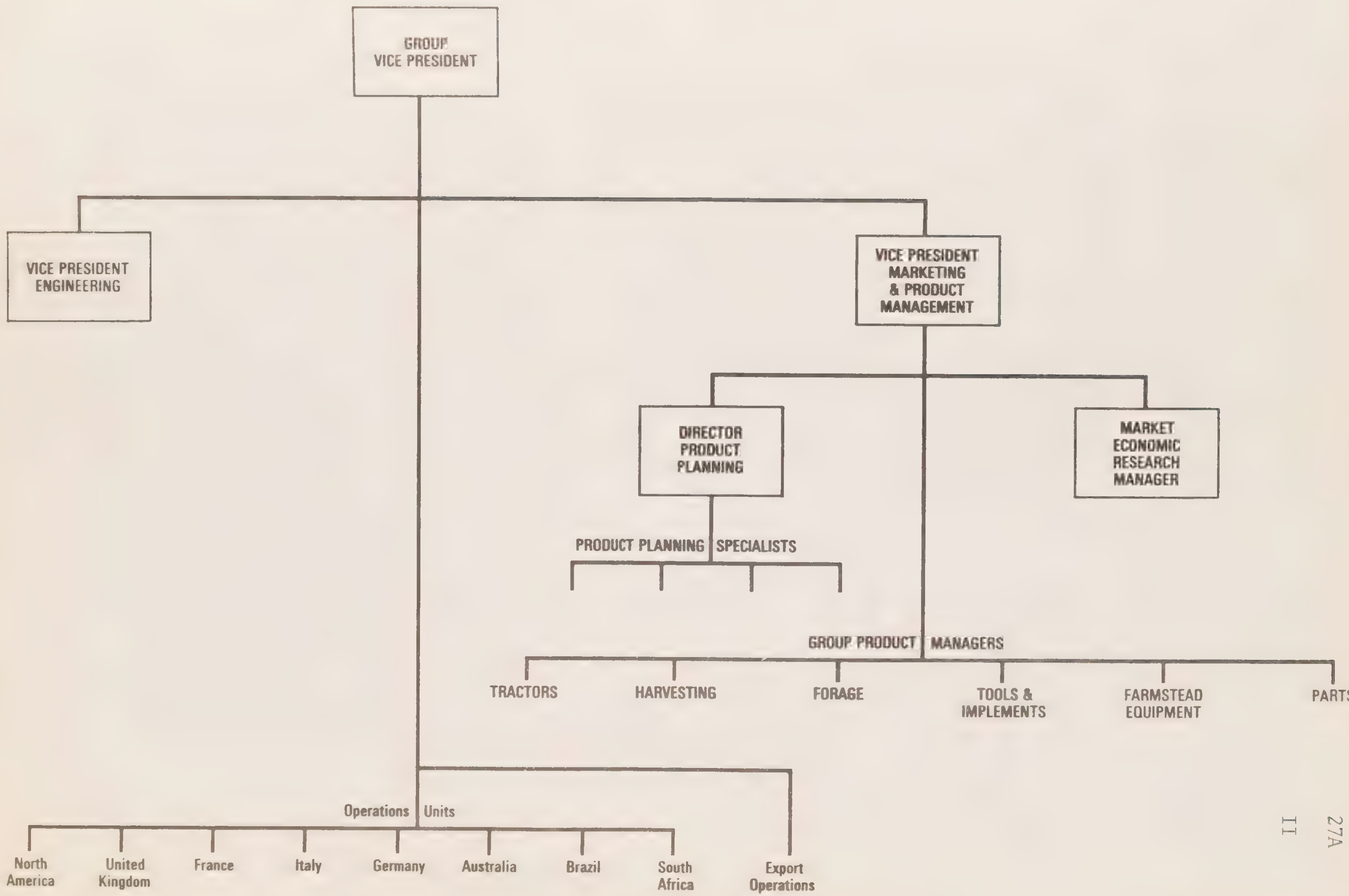
FARM MACHINERY GROUP

The farm machinery group is by far the largest of MF's product groups. In 1966, it contributed about 72 percent of MF's consolidated sales. Its production is integrated worldwide, its position in the market is of some repute, and most of its operations units are long established in contrast to industrial and construction machinery operations units. Presently, there is some overlap between the farm machinery and industrial and construction machinery groups in the responsibilities of their respective operations units, e.g., the farm machinery group - North America is responsible for sales of industrial and construction machinery in Canada.

Organization and Function

The farm machinery group consists of the group vice-president, the group staff and the farm machinery operations units (see following chart). The group staff discharges two functions vital to the success of farm machinery operations. One is the development of a line of products that balances the requirements of the various regional markets against the goal of product commonality. The other is the development of worldwide marketing strategies to

FARM MACHINERY GROUP



support regional distribution and selling efforts.

Group Vice-President - Farm Machinery

As mentioned earlier, the group vice president himself acts as an extension of the office of the president. As such, he is responsible for the total management and performance of the group through the most efficient short- and long-term use of his group's resources. His responsibilities include engineering and manufacturing, marketing and supporting administrative efficiency. (The group vice president-farm machinery is also accountable for MF's export operations, a function covered later in this chapter.) He draws upon the parent company's general staff for whatever support is required to plan, conduct and control all aspects of the farm machinery business.

The two farm machinery group staff divisions, (1) marketing and product management and (2) engineering, assist the group vice president by focusing their attention on the specific requirements of the farm machinery product line. The marketing and product management division brings a "total business" viewpoint to bear in planning for and marketing the product line. Engineering, on the other hand, provides technical support for all phases of new product process and follows up to see that the objectives of specific new product projects are achieved by the engineering departments in the farm machinery operations units.

Marketing and Product Management

Marketing and product management is the focal point for ensuring that MF improves its farm machinery market penetration throughout the world. It assesses the company's competitive position, strategies and programs to achieve growth in each product segment of the farm machinery line. It may draw upon all functional skills available throughout the company to assist it in so doing.

This combination of responsibilities requires marketing and product management to combine marketing and total business management concepts in planning new products and scrutinizing the performance of ongoing products. The extent to which the company profitably improves its market penetration of each segment of the farm machinery line is the prime measure of success for marketing and product management.

A key activity in improving the market penetration of each product segment is the development of product line strategies. The vice president marketing and product management recommends worldwide strategies that will provide the company with a fully competitive product line. Much of the input for these strategy recommendations comes from the farm machinery group's operations units. Essentially, this input is the means for

reconciling geographical considerations with the goal of product commonality and then recommending the development of competitive products with the greatest worldwide acceptability.

Product planning: because of the scope of these responsibilities, the vice president marketing and product management is assisted by his director product planning and the six product planning managers who function under him.

Each of the product managers specializes in one of the following segments of the total farm machinery line: tractors, harvesting, forage, tools and implements, and farmstead equipment. The product segments selected for specialized attention may change over time as product and market needs evolve. A sixth product manager devotes himself exclusively to parts for agricultural machinery.

The primary objective of a product manager is to increase, profitably, the worldwide market penetration of his product segment. Based on user requirements and cost assessments, he recommends the total marketing strategy for his product segment. This includes recommending the products the company should market, analyzing alternative sources, devising promotional strategy and estimating distribution requirements.

A product manager constantly surveys the marketing and other economic aspects of his segment of the product line. He recommends marketing changes to improve worldwide penetration of his product segment.

In keeping with his role, a product manager has the following specific responsibilities:

- assessing the worldwide performance of his product segment to evaluate each product in terms of growth, market penetration, breadth and quality of distribution and field performance versus competitive machinery;

- developing and recommending a worldwide strategy for his product line, drawing heavily on the marketing planning efforts of the operations units;

- coordinating the specific product proposals from different operations units and ensuring that they are compatible with approved worldwide strategies. In determining performance characteristics or features of proposed new products, he works with engineering to develop detailed product definitions that take into account design feasibility, cost and competitive requirements. Prior to product introduction

he defines the information required for periodic product re-evaluation and appraisal. In addition, he works with the logistics staff to coordinate supply availability in the various geographical areas where a new product will be introduced;

- maintaining close relationships with the vice president engineering to encourage major product design advances that will increase his products' utility and customer acceptance;

- after product introduction, coordinating the worldwide evaluations of field performance, and customer acceptance. This includes the review of warranty service reports with engineering to determine the need for design improvements;

- reviewing and recommending merchandising and promotion programs based upon his study of merchandising plans and promotional ideas from operations units. He determines which promotional ideas can be adapted by other operations units and coordinates promotions which may spill over market boundaries;

- searching for and capitalizing on marketing techniques to increase the acceptance of his product segment. This includes investigating new distribution channels and new approaches to financing customers.

Each product manager works with a product planning specialist who gives his complete attention to the product manager's segment of the product line. Product planning specialists keep abreast of changes in worldwide farming practices, identify desirable product changes and work with engineering to define new products.

The director product planning, who supervises the product planning specialists, is the parent company's authority on farm and crop practices around the world. He maintains contacts with major agricultural institutions and keeps informed on trends in world agriculture which affect mechanization. He evaluates the trends in agricultural efficiency, such as the development of new seed or plant strains, new fertilizer or chemical treatments and livestock handling; and he recommends development of machinery required by new crop production techniques.

A market and economic research manager works with the vice president marketing and product management to provide farm machinery market and economic data. These data are useful to product managers in

preparing worldwide product strategies and assessing the progress of operations units.

Engineering

The engineering division of the farm machinery group provides the leadership necessary to help MF achieve and maintain technical superiority in farm machinery. The vice president engineering is accountable for directing farm machinery research and advanced development; for providing technical assistance in the development of product strategies and proposals for farm machinery products; and for coordinating design activities of engineering departments of the individual operations units within the group.

The vice president engineering and his staff study technological advances in farm practices for their possible impact on farm machines. They seek to adapt developments from other industries, e.g., engineered plastics, applicable to the current MF farm machinery. In addition, they constantly strive for more efficiency in existing machines and ways to meet long-range machine requirements identified by marketing.

When new, potentially acceptable, technological ideas are advanced by operations units, group staff or general staff, the vice president engineering initiates and oversees their research and

development.

Although the primary responsibility for developing product strategies lies with marketing and product management, engineering also plays a major part in this process. For example, the vice president engineering, through operations unit engineering departments, advises the group product managers on the technical feasibility and design costs of new machinery under consideration.

He also ensures that operations unit engineering departments perform analyses and draw together the information necessary to translate the general requirements set by product managers into a detailed product definition which includes such information as basic dimensions, weight, power, specific features, and cost targets for manufacturing and tooling. In addition, he initiates proposals for new products incorporating technological improvements that could have a significant commercial impact.

The engineering division also provides technical direction and coordination for all engineering activities in the farm machinery group in accordance with the overall design guidelines set by the vice president research and development, a member of the general staff, who is responsible for overall leadership of the company's research effort, technical coordination and product integrity.

The relationship of the farm machinery group's vice president engineering with the vice president research and development is unique in the parent company; for their positions are as nearly counterparts as exist between the product group and general staffs.

Their relationship is based on the fact that the group vice president-farm machinery is responsible for the total management and performance of the group and its products, including engineering aspects. Therefore, the vice president engineering, a member of the farm machinery group staff, as the representative of the group vice president-farm machinery, may exercise line authority on his behalf, regardless of the staff nature of his position. This is consistent with operational demands and it is logical vis-a-vis the responsibilities of the vice president research and development, a member of the general staff, whose prime role is providing the president with independent appraisals of MF's approach to balancing technological demands with other concerns in the total management of the worldwide enterprise. In so doing, the vice president research and development functions both as analyst and catalyst.

The group vice president engineering, on the other hand, is more concerned with the operational necessities facing the operations

units in the discharge of their current engineering activities. For example, he reviews the planning for major new product projects to ensure that specific and realistic time, cost and performance targets are established. Then he follows up to see that these targets are met.

He also recommends plans to the group vice president for the development of the group's engineering resources. Working with chief engineers and general managers, he assigns design and development projects to operations units engineering departments. In addition, he provides guidance in helping these departments evaluate expenditure levels for engineering activities under local control, i.e., maintenance of design, cost reduction/value analysis and design studies for new products.

GENERAL STAFF

This staff provides a unifying force throughout the entire world-wide enterprise. It does this through the services it renders the president and the product group staffs.

These services include:

- development of company-wide strategies for the use of money, personnel and facilities;

- coordination of intergroup aspects of product strategies;

- formulation and updating of company-wide policies to meet worldwide conditions;

- coordination of intergroup activities that cross product group lines: finance, logistics, technical development and management succession planning;

- introduction of selected new management techniques;

- provision of specialist guidance to operations units.

The general staff consists of six departments: finance and administration, research and development, logistics, personnel and industrial relations, manufacturing and special operations.

Finance and Administration

As its name implies, finance and administration embraces activities broader than finance alone. In addition to its central direction of the allocation of financial resources, this department provides a wide range of services for the parent company and its operations units. These services include assistance on financial and legal

matters, the administrative introduction of common procedures and policies and the introduction of advanced management science techniques.

The vice president finance and administration is the principal financial officer of the company and reports directly to the president. He assists the president in the establishment of financial goals for the company; recommends and works out changes in the capital structure of the company and its statutory elements; and develops plans for the deployment of assets and the channeling of financial resources. He examines and reports on the operating results and financial condition of the company. He analyzes variances from approved plans, their causes and the financial aspects of possible corrective action. He also advises the president on financial aspects of recommended capital expenditures and strategic or operational plans submitted by the product groups and their operations units. Additionally, he maintains contact with many financial institutions and governmental agencies worldwide.

In carrying out his financial responsibilities, the vice president finance and administration directs and coordinates the activities of the comptroller and of the treasurer. He also gives general direction to the director legal services and the management

science manager. The following passages describe the duties of these executives.

Comptroller: the comptroller ensures that Massey-Ferguson managers are provided with the financial tools they need to plan their operations and make decisions effectively. He performs the following functions:

- ensures that the company's cost, expense, and income recording and reporting systems provide management at all levels with the information required for the timely evaluation of alternative courses of action, for the preparation of strategic and operational plans, for measurement of results, and for the prompt development of corrective action programs whenever required. An example is the development of a system for generating product cost data and the assistance rendered to install the system in individual operations units;

- furnishes financial services to the product groups and to the general staff divisions. This includes providing summaries of plans and operating results, as well as financial analyses of strategic plans, annual plans, and operations unit proposals;

- provides guidance and specialized services relating to inter-unit pricing arrangements so as to take into account established sourcing strategies and profit improvement;

- ensures that the company's financial reporting for governments and shareholders fulfills the statutory requirements of the countries in which it operates;

- advises and counsels the various operations unit comptrollers on such technical matters as cost accounting and systems and price analysis techniques;

- coordinates to achieve maximum advantage from special reliefs and alternatives permitted by tax legislation.

Treasurer: one of the areas of decision reserved to the parent company is the allocation of money. The allocation process has to be applied in planning worldwide activities and in implementing approved strategies or plans.

The treasurer works with line managers to determine the future fund requirements of each of the product groups and operations units, e.g., for financing inventories, receivables, and credit programs, or for new plants and tooling of new products. Once these overall requirements have been estimated, the treasurer reviews recommendations from group and operations unit management as to the sources, terms and conditions of local financing required to meet their strategies and operating plans, and advises them on the best way to deal with any surplus or deficiency.

Once the financing aspects of strategies or plans have been set, the treasurer assists group and operations unit management in local financing arrangements. In addition, he arranges the transfer of funds between units as required, regulates inter-unit credit, and manages the internal flow of the company's funds.

Besides his responsibilities relating to the provision of funds, he is involved in the custodial control of the company's financial resources. He ensures that protective directions governing the use and security of funds are established and adhered to. Examples include the authorized levels of retail, dealer and inter-unit credit; advances to associate companies and third parties; and the incurring of indebtedness. He is the clearance point for major changes in trading terms, and for ensuring that operations unit credit programs are in line with company policies.

Where company debt has been decentralized to local operations units, the treasurer exercises control through financial personnel in these operations units. He and his staff monitor the current cash position of each unit. In countries where the financial requirements of two or more local units need central coordination, he oversees the necessary arrangements. He also maintains close contact with the financial community in the major countries where Massey-Ferguson operates.

Legal services: the director legal services is the principal internal legal adviser to the president and to all parent company management. He is responsible for the calibre of legal services performed within the operations units, and for relationships with outside counsel retained by the company and its subsidiaries. He is also responsible for the control of all patent, trademark and copyright matters, and licenses relating to them.

In these capacities he takes the initiative to ensure that legal obligations of the company and its subsidiaries are properly recognized and that their rights are adequately protected throughout the world. He reviews major projects and plans and advises whether any legal barriers exist to their successful execution. He also directs the company's internal legal work covering agreements, contract negotiations, lawsuits, and other matters. He formulates policies and procedures regarding the handling of legal affairs in

operations units and ensures their proper application.

To successfully discharge these responsibilities, the director legal services must stay informed on all major international regulations and national legislation, existing and proposed, which may affect the company's programs worldwide. He oversees legal activities undertaken by the secretaries of subsidiary companies.

Management sciences: this activity, headed by the management sciences manager, is primarily concerned with assisting the general staff, product groups, and operations units in the application of management science techniques to their own activities. Management sciences go beyond the traditional "systems and procedures" function, especially in the use of computer technology and operations research to accelerate the flow of management information and improve decision-making capability. Specifically, the application of management science techniques within Massey-Ferguson might include the following:

- risk analysis to determine the relative attractiveness of alternative capital expenditure proposals;

- simulation or model building to evaluate the impact of alternative approaches to product strategies or pricing;

- linear programming studies designed to optimize distribution costs and customer services;

- an integrated approach to the entire system of order processing, production scheduling, and consolidated shipments to markets and dealers;

- computerization of engineering change records.

The management sciences function supplements operations unit capabilities in a number of ways. Most importantly, it assumes primary responsibility for keeping informed about developments in the field of management sciences and for evaluating their applicability within Massey-Ferguson. It also provides technical assistance to operations units in the design and installation of complex business systems.

Once a successful system has been installed in an operations unit, management sciences aids in transferring it to other parts of the company, using personnel from the originating unit wherever possible.

Research and Development

The vice president research and development has three major areas of worldwide responsibility: overall leadership for the company's research effort, technical coordination and product integrity. In discharging these responsibilities he contributes to MF's success in the marketplace by enhancing its ability to offer superior

products that meet the customer's requirements at a competitive price. To do this effectively requires that the company maintain its technological capabilities at a high level -- both to keep pace with developments within the industry and to anticipate and take advantage of technological advances. As product life cycles grow shorter and the pace of technological change accelerates, the vice president research and development ensures proper balance between the technical efforts devoted to meeting short-term competitive threats and those required to ensure the Company's long-range success.

He assists the product group engineering vice presidents to establish balanced and effective research and development programs. He works with them in forecasting major technical changes likely to take place within their product categories and he reviews their assumptions about competitors' product innovations.

He advises the president on the extent of the company's total research and development effort and on the allocation of funds to meet it. He ensures that the company's long-range product possibilities are not sacrificed to short-range pressures for updated designs. In doing this, he encourages the exploration of radically different ideas and stimulates product group engineering vice presidents to take reasonable risks in committing manpower to projects that have no certain or immediate return.

The vice president research and development acts as the final technical authority on all product strategy recommendations or major product proposals that involve intergroup considerations.

To ensure a common, worldwide engineering design approach that will satisfy the logistical requirements of the company, the vice president research and development sets overall design policies and guidelines to provide the necessary commonality and interchangeability, while allowing for design flexibility that will meet local conditions. He also ensures the development of common engineering procedures and adherence to them by product group engineers.

The vice president research and development has central staff authority for preserving the integrity of the company's products. He ensures that worldwide standards of product quality, reliability, durability and workmanship are established and maintained.

Logistics

The director logistics is responsible for developing and maintaining an effective flow of goods to customers at the least possible expense. He does this, in part, through ensuring the company purchases its manufacturing inputs at maximum economy. He is also responsible for ensuring that commonality and interchangeability do not break down because of variances in materials or transportation difficulties.

He also ensures the efficient factory-to-consumer distribution of product.

These responsibilities correspond with the staff elements in the logistics division: sourcing and supply, international purchasing, materials control and parts. The responsibilities in each of these areas are summarized below:

- sourcing and supply: this function is responsible for developing and coordinating long - and short-range sourcing, supply and transportation plans for raw materials, components and finished machines for the entire company. These plans are based on the location and capacity of existing manufacturing facilities;

- international purchasing: this function seeks economies by taking advantage of the volume of the company's worldwide purchases. Once possible economies are identified, international purchasing assists operations units in placing orders. International purchasing also analyzes opportunities for economies in the internal and external sourcing of major components used by operations units;

- materials control: this function is responsible for implementing new techniques controlling the flow of materials through the subsidiaries' integrated manufacturing facilities;

- parts: parts have a direct impact on MF's reputation with its customers everywhere. The parts function is the focal point for policy formulation, planning and coordination of all parts supply and distribution activities worldwide.

Personnel and Industrial Relations

The vice president personnel and industrial relations and his staff make contributions which are uniquely important to the long-term success of the Massey-Ferguson group of companies. This is true because in any analysis the ultimate success or failure of any enterprise depends on the qualities and characteristics of the people who are that enterprise, particularly its managers.

The vice president personnel and industrial relations makes another major contribution through his planning and coordination of negotiations and other relations with organized labor. MF's various

manufacturing process require the services of a skilled labor force. At the same time labor's actions, in MF's opinion can, without rational basis, destroy the delicate balance from which profit derives in Canada's competitive, free-enterprise systems.

The vice president personnel and industrial relations is responsible for ensuring that the company has sound management resourcing, recruiting and succession planning programs. He helps operations units determine their future manpower requirements, prepare management development and succession plans and evaluate management candidates. He also plays a key role in the implementation of plans involving parent company personnel, general managers and department heads in operations units and in inter-unit transfers. The effective use of people -- especially competent managers -- ranks with the efficient use of financial resources in determining the competitive strength of the enterprise.

In the area of personnel administration, he recommends company-wide policies and plans in such areas as management compensation, employee benefits and training. Once these policies are authorized, he ensures their proper application throughout the company.

In industrial relations, the vice president personnel and industrial relations develops company-wide policies and, when these are authorized, ensures their application. He coordinates the industrial relations strategies of the worldwide enterprise. He devotes continuing attention

to ensuring that collective bargaining provisions and industrial relations practices introduced in one operations unit do not prejudice the interests of another operations unit or the company as a whole. And he is responsible for ensuring that industrial relations management in each operations unit is given the technical assistance and overall guidance necessary to deal with local situations.

Manufacturing

One of the greatest opportunities for profit improvement throughout the whole company lies in reducing manufacturing costs. The manufacturing division provides worldwide service directed toward this objective, especially in the development and application of advanced manufacturing processes and techniques for use by operations units.

The vice president manufacturing reports directly to the president. His responsibilities relate to the improvement of manufacturing techniques and the reduction of manufacturing costs; the review of capital expenditure for manufacturing purposes; worldwide quality control techniques; and technical assistance to new operations units.

The execution of these responsibilities takes the following form:

Improvement of manufacturing techniques: the principal contribution the manufacturing division can make to reducing production costs worldwide is the assistance provided to group vice presidents and operations units in introducing and applying new manufacturing processes or techniques.

Manufacturing draws on a number of different sources for new ideas. For example, the vice president manufacturing and his staff maintain a close watch on technological developments within their own and related industries. This activity involves more than just reporting on new developments in the manufacturing field. It requires a detailed investigation of promising new techniques in order to assess their feasibility and potential value to Massey-Ferguson. At times manufacturing may want to sponsor research into new production techniques by Massey-Ferguson.

In addition to monitoring external sources, manufacturing also stays abreast of new ideas being developed within the operations units. In this role the division assists operations unit personnel in evaluating the effectiveness of their ideas and in working out pilot applications. Manufacturing is responsible for selecting those techniques that appear to have worldwide applicability for further study and dissemination.

Manufacturing advises operations units on the advantages of new techniques. When detailed technical assistance is required, the division uses, wherever possible, personnel from other operations units with previous experience in application of the new methods.

Review of capital expenditure for manufacturing purposes: the staff of the manufacturing division assists group management and operations units in the review of the location, layout and cost of new facilities, and the vice president manufacturing ensures that capital expenditure proposals for manufacturing facilities receive the technical review required by the president before being submitted to the board of directors.

Worldwide quality control: the vice president manufacturing ensures that manufacturing quality control techniques in use throughout the company are adequate to meet the criteria and standards established by research and development on the general staff or by the engineering divisions within the product groups.

Technical assistance to new operations units: the division helps in the establishment of an efficient manufacturing organization in any operations unit acquired or started up by the company. It also arranges to provide the required technical assistance on the manufacturing aspects of projects undertaken by the special

operations unit. Manufacturing ensures that the necessary expertise is also drawn from existing operations units whenever required.

Manufacturing provides worldwide leadership in the improvement of all measures leading to industrial safety in the company's facilities, wherever located, both in the setting of safety standards and in monitoring their application.

Special Operations

The company's international expansion has involved the establishment of new manufacturing facilities outside of existing operations units. Such expansion is accomplished through the director special operations. He becomes involved as soon as a proposal arises within or outside of the company relating to the manufacture or assembly of company products in a territory where MF has before undertaken only export activities.

He must evaluate all the technical, economic and political considerations that bear on the situation and then recommend a course of action to the president. He may recommend that the company avoid local manufacturing involvement. On the other hand, if a local activity is necessary or desirable, he may recommend that the company build a new facility, acquire an existing company or

license a local manufacturer. He will also coordinate or conduct the negotiations that ensue, and then oversee the implementation of any resulting agreement.

The special operations division consists of three staff elements. The first, planning, is responsible for coordinating all aspects of the projects the division undertakes. The second, administration, gathers and consolidates the detailed financial and statistical information needed both for the submission of project recommendations and for the supervision of ongoing associate and licensee operations. The third, technical, coordinates the provision of design and specification information of technical aid, or production facilities or supplies and of manufacturing assistance.

Some special operations undertakings stem from requirements of company strategies. Some result from trade restrictions that prevent full exploitation of local opportunities through existing import and distribution arrangements and some stem from government enforced establishment of new manufacturing facilities within a country.

Throughout all stages of a project, the director special operations draws upon general staff and group staff division and functional experts from operations units for technical advice and assistance.

Export Operations

Export operations is responsible for marketing farm machinery and/or industrial and construction machinery in countries and territories outside of operations unit boundaries. It is treated for organizational purposes similarly to an operations unit but it has no manufacturing or engineering facilities.

The general manager export operations reports directly to the group vice president-farm machinery. His position in relation to the overall structure of the company corresponds generally to that of the general managers of operations units described earlier in this chapter.

Export operations selects and appoints independent distributors under franchise of the parent company for the import and sale of a specific product line and supervises and assists each distributor in the exercise of his franchise. Sales to franchised distributors are made in the name of the subsidiary company which supplies the goods.

The export operations unit possesses a full range of marketing services, the field force necessary to supervise local distributors and certain supply, financial and administrative services. It relies on the various operations units for technical and promotional back-up, for the timely shipment of goods, and for cost information needed to assess profitability of export sales. Export draws

continually on the engineering departments of supplying operations units for advice and assistance in the development of product proposals for their specialized markets.

Specialized Overseas Subsidiary Companies

Also operating in the overseas areas are four companies established to undertake specialized functions beyond the scope of operations units or other MF legal entities. These are MF International A.G. (Switzerland), Agrotrac S.A. (Panama), MF Services N.V. (Netherlands Antilles) and Perkins Services N.V. (Netherlands Antilles.) Their activities include the financing of new or existing MF ventures; distribution financing in support of wholesale and retail activities; international trading functions relating to certain products from outside suppliers; and technical services pertaining to patents, licensing and technical aid.

ENGINES GROUP

The engines group, which consists of the worldwide Perkins organization, is really an international manufacturing and marketing organization within an international manufacturing and marketing organization. F. Perkins Limited is the world's largest manufacturer of diesel engines and, of course, supplies Massey-Ferguson with all its diesel engine requirements. However, it treats MF as only one

of its customers. The engines group has subsidiaries, licensees, manufacturing or marketing operations in 14 countries, including its home base of the United Kingdom.

Perkins' sales to MF provide Perkins with a substantial base for building the volume necessary for economical engine production. In addition, the manufacturing required to supply other equipment manufacturers provides economies of scale.

Prior to 1959 Perkins was an independent company with a name known around the world. A number of its customers were, and still are, competitors of Massey-Ferguson. For these reasons Perkins has been kept sufficiently self-contained to preserve its separate identity and to protect confidential information about competitors' future product plans.

The operations of the engines group differ from the other Massey-Ferguson product groups. Perkins makes and sells components rather than end products; and fewer than 25 of its customers account for 80 percent of its sales. As a result, Perkins concentrates its engineering attention on maintaining cost leadership so as to discourage its customers from supplying their own requirements internally. In addition, it strives to keep its basic engine designs sufficiently flexible to allow for specific customer variations while utilizing one set of tooling. In its marketing

activities, Perkins supplies strong application engineering support to tailor a basic engine to the needs of a customer's specific product.

Engines Group Organization and Integration with MF

The overall organization of the engines group is basically similar to that of the other product group. It has a group vice president, a group staff, and operations units in the United Kingdom, France and Brazil. A separate organizational unit in the group -- associate and licensee operations -- is responsible for overseeing the operations of Perkins' associate companies and those that manufacture Perkins products under license.

The engines group staff is more self-contained than the group staff in either farm machinery or industrial and construction machinery. This reflects the need to maintain Perkins' separate identity as an engines supplier to original equipment manufacturers, some of whom compete with Massey-Ferguson. It also recognizes the importance of protecting confidential information about competitors' future product plans.

Although Perkins operates with a separate identity, its activities must be closely coordinated with the rest of the company because of the engines group's role as a major supplier to other MF product

groups and in order to integrate administrative activities or achieve operating economies. Because Massey-Ferguson is Perkins' largest customer, Perkins closely coordinates its activities in four areas -- new products, product integrity, logistics, and parts -- with the farm machinery and industrial and construction machinery groups.

The engines group is important to the international growth and profitability of the parent company. Its sales rank only behind tractors and grain harvesting machines in dollar volume. In 1966, its engine sales, exclusive of its sales to MF, amounted to almost $99 million -- a volume more than twice as great as such sales in 1960, the first full year following its acquisition. Manufacturers of materials-handling and transport equipment of all types are turning increasingly to the use of diesel engines. With Perkins' reputation, this trend cannot but help benefit the company.

Of still greater importance is the fact that Perkins-type diesel engines are beginning to gain greater acceptance in the trucking industry, particularly in the U.S. For example, the new Perkins V8-510 cubic inch engine has been developed to take advantage of the trend toward faster motorway trucking operations.

In addition to developing, in 1965, a version of this new V8 engine

for agricultural machinery applications, Perkins introduced a smaller engine unit designed to meet the power requirements of small commercial vehicles. This engine is also suitable for taxis and automobiles providing near-gasoline-engine performance with substantial fuel economy under comparably hard driving conditions.

OPERATIONS UNITS

The concepts underlying MF's worldwide management organization call for decentralized manufacturing and marketing. Accordingly, responsibility for the production and marketing of company products in each country or geographic area where the company owns manufacturing facilities is assigned to largely self-contained operations units.

Each product group has, or will have, operations units established on a geographic basis; this means that in any geographic area there might be two, or even three, separate operations units.

These operations units are the basic functional -- as opposed to legal -- entities in the worldwide MF structure. The detailed knowledge of local conditions possessed by operations unit executives provides the foundation on which global strategy is formulated; and on the operations units' initiative and capabilities depends the successful implementation of global strategies.

Operations Unit Organization

An operations unit is organized primarily on a functional basis. An operations unit normally includes the operational functions of engineering, manufacturing, marketing, and planning and procurement. These are supported by the staff or service functions: comptrollership, personnel and industrial relations, public relations and, in some units, management services. For the furtherance of the parent company's strategies, it is necessary for the senior executives of the various operations units to work closely with each other and with parent company personnel. The responsibilities of functional departments are basically the same in all operations units. However, each individual operations unit management tailors its own structure to meet local requirements in a manner compatible with the parent company's organizational principles and practices.

Operations Unit Management

The operational execution of a product group's plans falls primarily upon the management of that group's various operations units. Within the framework of established policies and approved strategies or plans, operations unit general managers have the freedom to make all operating decisions required to increase sales, reduce costs and generally improve return on assets.

Each general manager of an operations unit is accountable to his group vice president to whom his overall plans are submitted and from whom he receives decisions, direction and guidance.

The general manager of an operations unit and his staff are expected to exercise initiative and imagination in developing and recommending strategies and plans for products, markets, distribution, manufacturing and the use of assets. Their recommendations provide the input for company-wide efforts to enhance profitability.

Although each operations unit is, by and large, a self-contained entity, each recognizes its interdependence with other operations units. Operations unit personnel communicate directly with their counterparts in other units in order to coordinate technical, supply and promotional activities. This helps operations units to improve their own performance; it also helps to relieve parent company product group personnel of routine coordination and information transfers.

Similarly, within any one country, continual liaison among industrial construction machinery, farm machinery and engines operations units is necessary. Free-flowing communications among them is vital to ensure the advantages of coordinated industrial relations strategies, bulk purchasing and joint administration in such areas as banking and insurance.

LOCATION OF FACTORIES

The manufacturing facilities of the Massey-Ferguson Limited subsidiaries and associated companies cover more than 16.3 million square feet in 16 countries. These countries are: Argentina (associated company), Australia, Brazil, Canada, France, Germany, India (associated company), Italy, Mexico (associated company), Morocco (associated company), Rhodesia, South Africa, Spain (associated company), the United Kingdom (England and Scotland) and the United States. Of these 16.3 million square feet, approximately 3.8 million are devoted to industrial and construction machinery manufacture, engine manufacture, furniture manufacture or are the property of associated companies. Farm machinery is manufactured in the remaining 12.5 million square feet. Of this plant area, 1.6 million square feet are in the United States and 3.2 million are in Canada.

(Exact locations of all subsidiary company factories, their square footage and products manufactured are listed on page 28 of the 1966 Massey-Ferguson Limited consolidated annual report.)

Behind these square footage figures stretches a story of manufacturing site acquisition that began in the 1840s and '50s when Daniel Massey and Alanson Harris opened their farm implement business. New chapters

are still being added.

Until 1910 all MF manufacturing facilities were located in Canada. Each manufacturing addition in Canada and elsewhere has its own story. Some of them reveal a high degree of happenstance. Others, typical of the years since World War II, were largely predicated on long-range MF operating philosophies. These dictated that if MF were to become established as a company of international stature and permanence it would have to have significant manufacturing representation overseas and it would have to increase its control of its own product sourcing. Since that decision was taken, MF has increased substantially the Massey-Ferguson content of its goods. Initially, much of the manufacturing expansion overseas was motivated by the desire to protect the company's foreign markets against tariff barriers. Other benefits such as economy of scale, lower unit costs and flexibility in response to changing international, political and economic circumstances also resulted.

Historical Highlights of Growth

Time and space do not permit a detailed tracing of the historical circumstances which have led to the present 16.3 million square feet of total manufacturing capacity. However, the following are the highlights of the period since July 22, 1891 when A. Harris, Son and Company Limited of Brantford merged with the Massey Manufacturing Company of Toronto:

- 1891: merger with Patterson Wisner Company of Brantford and Woodstock;

- 1892: acquisition of stock in the Verity Plow Company of Exeter;

- 1895: the Bain Wagon Company of Woodstock became a subsidiary;

- 1904: the Kemp Manure Spreader Company of Brantford was purchased.

These mergers and purchases located the company in Canada at Woodstock, Brantford and Toronto; the latter two locations have been retained to this day and have been greatly expanded.

- 1910: controlling interest purchased in Johnston Harvester Company of Batavia, New York;

- 1916: MF started stationary gasoline engine manufacture in Weston (a Toronto suburb) with machinery acquired in 1910 with the purchase of the Deyo Macey Company of Binghampton, New York;

- 1926: manufacturing facilities established at Marquette, France;

- 1927: manufacturing activities begun at Westhoven, Germany;

- 1928: Massey-Harris Inc. was formed in the United States following acquisition of J.I. Case Plow Company. Racine, Wisconsin became head office for the new U.S. company;

- 1947: Massey-Harris Limited in the United Kingdom was established as a public company with manufacturing facilities at Manchester, England and, beginning in 1949, at Kilmarnock, Scotland;

- 1947: Massey-Harris secured an interest in South African Farm Implement Manufacturers Limited of Vereeniging, South Africa;

- 1948: Goble Disc Works at Fowler, California, purchased. As the Fowler Division of Massey-Harris Company it manufactured western-type tillage implements.

These acquisitions facilitated the company's transition to an organization of mass production, extended its product line and permitted it to acquire significant technological developments in agricultural machinery.

Beginning with the Massey-Harris/Harry Ferguson merger in 1953, the overseas expansion of the company's manufacturing facilities was planned to enhance the company's position in the tractor market, to meet competition from U.S. companies and to cope with the emergence of trade restrictions in export markets.

- 1953: Massey-Harris and Harry Ferguson companies merged. With this merger the Massey-Harris companies acquired the rights to the Ferguson System of hydraulic and three-point hitch linkage for mounted implements plus a tractor assembly plant at Detroit;

- 1955: manufacturing facilities of Massey-Harris-Ferguson G.m.b.H. established at Eschwege, Germany;

- 1955: Acquisition of H.V. McKay Massey-Harris Proprietary Limited of Melbourne, Australia. Massey-Harris-Ferguson previously had a minority interest in the company. With this purchase MF also acquired the Sunshine Company of Waterloo, Ontario, now known as Sunshine Office Equipment Limited;

- 1957: Massey-Harris-Ferguson purchased the assets of Midwestern Industries Inc., of Wichita, Kansas to manufacture industrial and construction machinery;

- 1957: Massey-Harris-Ferguson Do Brasil, S.A. incorporated in Sao Paulo, Brazil. The company began volume production of tractors in 1962;

- 1957: Transmission and Axle Plant in Detroit purchased from Borg-Warner Corp.;

- 1959: Massey-Ferguson Limited acquired F. Perkins Limited of Peterborough, England, world's largest manufacturer of diesel engines for agricultural, industrial and marine use;

- 1959: tractor manufacturing assets of Standard Motor Company in England and France purchased;

- 1959: Motores Perkins, S.A. incorporated in Sao Paulo, Brazil;

- 1960: G. Landini and Figli, S.P.A., second largest Italian tractor manufacturer, acquired;

- 1960: tractor production began at Beauvais, France;

- 1960: combine manufacture began in Spain by an MF-affiliated company; followed by truck and tractor manufacturing in 1966;

- 1960: executive offices and headquarters of Massey-Ferguson Inc. moved from Racine, Wisconsin to Detroit, Michigan;

- 1961: production began by Tractor and Farm Equipment Limited of Madras, India, in which Massey-Ferguson holds a 49 percent interest;

- 1963: North American Combine Plant built at Brantford, Ontario;

- 1964: MF launched a \$5-million Detroit expansion program. Expansion included purchase of a plant and office facilities to house manufacturing of the company's expanded line of industrial and construction machinery;

- 1964: Art Woodwork Limited in Montreal acquired; produces full line of wooden office furniture;

- 1965: purchase of the assets of Badger Northland Inc. of Kaukauna, Wisconsin. Badger Northland manufactures and markets farm materials handling equipment and field harvesting machines;

- 1965: purchase of facilities in Des Moines, Iowa for the North American Implement Plant and the executive offices of Massey-Ferguson Inc., the major U.S. subsidiary company;

- 1966: purchase of facilities for expansion of transmission and axle manufacture in Detroit;

- 1967: plant purchased near Akron, Ohio, for the manufacture of new, and heavier, industrial and construction machinery.

MF's international manufacturing complex today totals 37 plants. In general, these are either sourcing factories which manufacture components and parts or assembly plants which assemble one or more categories of MF products. These facilities purposely include many overlapping capabilities. This enables MF to take advantage of local economies and to preserve a high degree of flexibility in response to political and economic changes. At present, MF agricultural tractors are assembled at Banner Lane, Coventry, England; Beauvais, France; Detroit, Michigan, U.S.A.; Sao Paulo, Brazil; Queretaro, Mexico; Barcelona, Spain; Madras, India; and Fabbrico, Italy; and under license in Morocco, Turkey and Pakistan. In addition, tractor assembly is scheduled to begin shortly in Thailand.

Such components as are not made locally at these sites, come mainly from Banner Lane and Beauvais. In addition, all tractor assembly plants receive Perkins diesel engines from Peterborough, England; Paris, France or Sao Paulo, Brazil.

As an overview, the total international manufacturing complex (subsidiary, associated and licensee companies) incorporates the following capabilities:

Plant Locations Worldwide by Type of Product

Type of Product	Plant Locations
combines	Australia, Canada, France, Germany, Spain, and the United Kingdom (Scotland)
diesel engines	Argentina, Australia, Brazil, France India, Italy, Mexico, Spain, United Kingdom (England)
implements	Australia, Brazil, Canada, France, Germany, India, Morocco, Rhodesia, South Africa, Spain, United Kingdom (England), United States
tractors	Brazil, France, India, Italy, Morocco, Mexico, Spain, United Kingdom (England), United States

Type of Product	Plant Locations
components	Canada, France, Italy, United Kingdom (England), United States

PRODUCT SALES DISTRIBUTION

The following graphs and tables show net MF sales by geographical market, i.e. Australia, Canada, France, Germany, South Africa, the United Kingdom and other; and sales by product group, i.e., farm machinery, engines, industrial and construction machinery and parts.

In general, the markets shown correspond with the areas of individual operations units, e.g., France, Germany, South Africa. The Canadian and U.S. markets, of course, comprise the North American operations unit marketing area. The graph showing net sales by products is keyed on the parent company's three product groups and reflects parts sales separately.

From these graphs and tables, it is possible to estimate accurately the relative importance of categories of machinery and the market areas in terms of the sales volume they produce. Trends are also evident. For example, the dollar volume of haying equipment has remained virtually the same over the last nine years,

whereas the dollar volume of tractors has doubled; Canadian sales volume has multiplied two and one-third times over the last ten years while maintaining its same relationship -- 10 percent -- to total sales.

AREA COMPARISONS

The following tables showing assets employed, sales, employees and sales volume per employee reveal that, in general, the higher the value of assets per employee, in any given area, the lower the volume of sales per employee in that area.

This is to be expected in an international enterprise dependent on the relatively free flow of goods and other resources across borders. Thus, in general, the deviation from the average sales volume per employee, i.e., $20,200, is a reflection of the extent to which an area is a net importer or exporter of MF goods. (This view, however, ignores variations in local productivity.)

Correspondingly, it is also interesting to note the heavy employee population in certain exporting areas, where indigenous sales per employee are low. For example, Canada, where the employee population is relatively high, has the lowest volume of sales per employee.

Area Comparisons - 1966

AREA (Population) (millions)	Assets Employed ($ Mils.)	Sales ($Mils.)	Employees as of Oct. 31, 1966	Area Sales Volume per Employee $	Assets per Employee
Canada (19)	$153.0	$96.3	7,810	12,300	19,600
United States (192)	229.4	290.4	4,914	59,100	46,600
Europe (444)	345.1	355.8	28,301	12,600	12,200
Australasia (13)	44.7	57.7	2,288	25,200	19,600
Latin America (204)	46.3	49.1	1,273	38,600	36,100
Africa (310)	25.1	46.5	1,454	32,000	17,300
Asia* (1,825)	2.2	36.3	NA*	NA*	NA*
TOTAL or AVERAGE	$845.8	$932.1	46,040	20,200	18,200

* Associated companies, i.e., not Massey-Ferguson employees.

II

MASSEY-FERGUSON GROWTH

To help establish the dynamic and competitive nature of the international farm machinery industry in which MF competes, it is worthwhile to compare the company's position at the beginning of the war and where it now stands.

Before World War II

By 1939 Massey-Harris was a name that already meant something to many farmers around the world. This is reflected by the fact that by that year, 40 percent of the company's sales were being made outside of North America, compared to 35 percent in Canada.

In the overseas markets, Massey-Harris dealers, distributors and branches had developed an international system of distribution and a network for commercial intelligence that would be valuable in postwar expansion of manufacturing and marketing.

That this expansion was necessary is evident in the fact that at the end of the war Massey-Harris Limited was still a small company compared to its major U.S. competitors. MH's total sales were less than half that of Deere and Company and compared even less favorably with International Harvester's.

After the War

In the United States market, Massey-Harris held an unenviable sixth place among farm machinery manufacturers. Compounding its problem was Massey-Harris' reliance on other manufacturers for tractor and implement components. In combines MH did hold a lead on the industry through the development of the self-propelled combine; but even there MH still depended on outside suppliers for engines and the complete power train.

By 1953, in terms of relative size and rate of growth, Massey-Harris had done well. Its worldwide sales volume had definitely surpassed that of the medium-sized North American companies. It had also grown more quickly than Deere and International Harvester. By 1953, before Ferguson merger, total Massey-Harris sales were 60 percent of Deere's.

Over the subsequent decade-and-a-half, Massey-Ferguson Limited has undergone a number of changes of major importance. Perhaps the most important and dramatic was the Ferguson merger. Others included:

- the change of management with its new emphasis on effective organizational structure, planning, reporting and decentralization;

- the further acquisition of overseas manufacturing facilities to protect MF marketing and the consequent emergence of a fully rationalized, international manufacturing and marketing complex;

- the introduction of fully coordinated efforts between market research, product planning and engineering to place the company in a strong technological position within the industry;

- the company's advances in the U.S. market;

- the introduction of a new line of combines and tractors which enabled it to start competing effectively for the trade of very large farmers.

In the 28-year span from 1939 through 1966, Massey-Ferguson's total worldwide sales grew from $21 million to $932 million. This span saw, in other words, the transformation of Massey-Ferguson from a small-to-medium company, by North American standards, to a large, modern, industrial enterprise. By 1966, it was characterized by its integrated nature, by its international scope of operations and by its use of highly developed concepts and techniques of organization and control permitting efficient operation. In the process, the percentage of Massey-Ferguson sales derived from outside of Canada grew from 65 to 90 percent.

ADVANTAGES OF WORLDWIDE OPERATIONS

Against the background of the preceding material on the structure and recent history of MF's worldwide operation, it is appropriate to consider the advantages -- enjoyed both by the company and, more importantly, ultimately by its customers, including Canadians -- of such a worldwide scope of operation.

Cost Advantages

Perhaps the most obvious of these advantages are cost advantages that arise from economies of scale and from the ability of MF to locate its production in centers of least cost. Both are inherent in MF's approach to the establishment, maintenance and expansion of its internationally integrated manufacturing complex. Economies of scale are particularly enhanced through the company's policy of economically maximizing interchangeability of component parts and cross-sourcing such parts between its various plants in several countries.

Technological Advantages for the Farmer

Another advantage of international operations is that they swiftly make available to Canadian farmers the results of MF engineering endeavors in all its operations units around the world. The organizational and operating principles of MF's engineering departments will be described later, in detail. They produce economies in research and development costs not available to isolated one-country operations.

But other, less visible benefits also flow to the customer from the actual execution of MF's internationally hinged engineering, manufacturing and marketing philosophies. The machinery itself enables the farmers using it to increase their productivity. This increased productivity, however, has implications far surpassing the short-or-intermediate-term benefits to the farmer.

National Economic Advantages

There are the benefits to the nation -- whether France, Brazil, India or Canada -- from the farmer's heightened productivity. For this productivity frees men from the soil, making them available to strengthen the industrial base of their nation. When this occurs, it helps create or strengthen what has been aptly called the revolution of rising expectations, a phenomenon certainly not restricted to western nations. These expectations are, of course, nothing less than consumer demand, albeit embryonic.

Thus, farm machinery and other agricultural inputs help create a market for an entire spectrum of industrial and consumer products. This market offers export opportunities to other nations who in conformity with the doctrine of comparative advantage can efficiently produce and market such products. In a restricted or specialized sense, this is, of course, what MF is doing today.

With respect to Canada, MF believes that the nation and its citizenry possess advantages which help enable MF to compete in the international farm machinery market. These advantages include a skilled labor force and the availability of manufacturing inputs.

Conversely, the nation derives advantages from MF's presence: the financial returns of international trade, employment for many of its citizens, tax revenues to many levels of government across the nation, and the provision of quality farm machinery at reasonable prices -- with the attendant growth it brings in agricultural productivity which helps farmers feed a growing nation.

International Flow of Technology

To a considerable extent, MF's ability to operate in Canada depends on a relatively free international flow of trade and the technology on which it is based. In the MF structure, the flow of technology is largely the result of the company's centralized direction and control of its engineering resources already described, its international deployment of manufacturing and engineering facilities and its export activity.

The availability of mechanized agricultural know-how, and the concrete presence of this know-how in the form of machinery, supporting services, and the administrative organizations, tend to accelerate the acceptance and adoption of advanced technology and speed the realization of the material

progress that they promise. Thus, the flow of technology into the developing nations through the medium of industrial corporations such as Massey-Ferguson helps them to transform themselves from primitive subsistance farming economies into ones in which latent economic potentialities can be realized.

The Business of Helping to Feed the World

This discussion is not intended to imply some exaggerated altruistic MF concern. The company, to survive, must compete successfully in an intensely competitive international industry. But Massey-Ferguson, of course, recognizes the human misery concealed within the statistics commonly used to reflect some measurement of present world hunger. Massey-Ferguson is concerned with the violence which present conditions, unrectified, will almost certainly produce. But, most importantly, Massey-Ferguson, as a modern, internationalized, industrial enterprise, is in a unique position to do something about such problems.

Over the past 10 years there has been a 180 percent increase, in constant dollars, in free world farm machinery sales, in the developing nations. Perhaps even more encouraging are signs that the governments of developing countries are recognizing the importance of agricultural mechanization and attaching priority to it. The 1967 Yearbook of the Far East Economic Review states that 1966 saw an important shift in emphasis from industry to agriculture in the economic policies of several

Asian countries.

Toward Greater Worldwide Enterprise

Massey-Ferguson anticipates that this trend will continue. Over the next five years, MF expects its sales in the developing nations to increase 80 percent. If the forecasts are accurate, it will be through MF's integrated international manufacturing and marketing complex that they will be satisfied.

To a large extent, such an accomplishment would actually be dependent on the concerted, but individual, contributions of the various managers described earlier in this chapter. Of all the resources needed to drive an enterprise, management competence is the most scarce. Both the degree of importance and the degree of scarcity of requisite managerial skills increase as the scope of international operations increases. The ability of MF to apply its managerial resources on a selective basis worldwide is one of its greatest strengths.

The parent company's new structure, described in detail earlier in this chapter, provides the maximum flexibility in the application of managerial talent. This may well be an intangible area, not susceptible to measurement; however, the appropriate use of such management resources has charismatic implications for customers, citizens, and governments alike, both here and abroad.

Implications of the Food-Population Gap

The Commission has asked "What is Massey-Ferguson doing to exploit the opportunities to increase agricultural production in presently under-developed countries?" And, "Does MF feel that North American type machines will be used in these countries or will there be an intermediate stage of more labour intensive, simpler equipment?"

The basic company approach to expanding its operations overseas in emerging nations was treated in the earlier section on special operations.

The two questions quoted above, however, have many implications not answered by the procedural approach discussed in the special operations section. These questions are so important they were the subject of discussion at the first international agribusiness conference in North America held in Chicago in May, 1967. At that time the parent company addressed itself to these questions in the following statements by the group vice president-farm machinery.

> "If mechanization were fundamental to any developing agriculture, it might be argued that farm machinery manufacturers could make their most significant contribution by, quite simply, <u>selling more equipment</u>. This would be a happy conjunction of altruism and self-interest. Unfortunately, the case for mechanization is far from being so clear-cut. The technological revolution which has taken place in North America, Europe,

and to a lesser extent Japan, in the last three decades, was sparked off by a world war which drained manpower from the land, forced governments to take steps to introduce mechanization, and compelled farmers to accept its value. It remains to be seen whether rationality can be as cogent a force as modern warfare...

"Even in straightforward economic terms we cannot say without qualification that mechanization is desirable. We must always bear in mind that any increase in production must be worth at least as much as the cost of attaining it. This balance is not always easy to achieve in a developing country. The technical means for increasing yields may dangle tantalizingly within easy reach and remain unusable. I would like to come back to this point later.

"We can say with confidence that by the time a high rate of productivity is obtained in any one country, mechanization will be playing an important part. But to switch from the long-term to the immediate involves us in calculations of a complexity to delight a systems analyst, and daunt anyone else. How much machinery can economically be employed? How soon? Of what kind? These questions can be answered only by taking into account many variables: the condition of the

of the infrastructure of the country concerned -- dams, irrigation, roads and railways; the extent of industrialization; the climatic and soil conditions; the relative priority to be given to fertilizers, insecticides, pesticides, improved seed strains, disease control, soil conservation, crop rotation, transport and storage facilities, animal health and nutrition; the attitude of the government concerned -- towards land reform, the supply of credit to farmers, the stimulating of co-operative buying and handling of equipment; the fact that at least initially, it may not be practical to insist on local production of machinery, and that high tariffs on machinery imports may not be in the national interest.

"Some new countries have rushed into purchases either of the wrong equipment or too much of the right equipment, more than their available personnel could handle or put to proper use. Others have been tempted to engage in tractor assembly and manufacturing projects even before the use of the equipment had been planned.

"...We would not consider submitting a bid for the supply of machinery to a new area without providing for a comprehensive training course as part of the 'package'...

II

"...During the last few years Massey-Ferguson has trained thousands of technicians from developing countries at its training farm at Stoneleigh, England. Hundreds of Indians are trained every year at a similar farm near Madras, India. The company has also supplied the equipment, know-how and manpower for a mechanization training center near Buga, Colombia to be run in conjunction with the government of Columbia and the Food and Agriculture Organization of the United Nations. We hope that students from all over South America will attend this centre, and then return home to teach what they have learned.

"I must tell you that in our training programs we are acutely conscious of trying to run before we can walk, but this is unavoidable if the race between world population and food productivity is to end favorably. To try to teach a peasant in a backward country how to operate a modern tractor is rather like attempting to make Beethoven's Hammerklavier Sonata the basis of a child's first piano lesson.... We can find ourselves trying to teach principles of mechanization to a man who thinks ploughing with bullocks is daring and

experimental. The tractor is part of a total culture which to him may be alien and incomprehensible. Before mechanization can be firmly integrated into the development of a backward country, a communications triumph beyond the dreams of Madison Avenue has to be achieved -- and quickly. When you consider that it took 10 years for the combine to be accepted in the United States, and closer to 16 for hybrid corn, you will appreciate the magnitude of the task.

"It is because we believe so firmly in the necessity of this fundamental orientation towards, and emotional attunement to, the framework of modern agriculture that Massey-Ferguson has launched, in conjunction with the FAO, a large-scale project, called Young World Food and Development.

"This consists of a series of seven seminars designed to strengthen and multiply youth organizations in the developing areas, and to throw light on the problems of motivating, training and financing young people. Five of these seminars have already taken place -- in Thailand for the Far East, Ethiopia for Africa, Peru for Latin America, Lebanon for the Middle East, and Italy for Europe. The seminar for North American

youth leaders takes place next week (May 15 - 19, 1967) in Des Moines -- and at this conference, as in the Rome one, delegates will concern themselves with the help they can provide for their less fortunate counterparts. A final world conference will take place in September (1967) in Toronto, and we hope the end result will be a blueprint for a massive attack, through young people, on the world food problem.

"In some developing countries, youth can constitute as much as 70 percent of the population and it is therefore potentially a massive force which could be brought to bear on the problem of growing more food. But part of the colonial legacy, and a direct consequence of the colonial education tradition, is a widespread contempt for farm labor. The Asian or African with initiative and imagination wants to be a doctor or lawyer, not to stay on the land. This point has been made again and again by youth leaders at our seminars in Bangkok, Addis Ababa, Lima and Beirut....

"...Massey-Ferguson is financing the Young World Food and Development project to the extent of half-a-million dollars, and that is of course no small sum for one

corporation to provide. But it is modest enough in the light of the FAO's estimate that up to 35 million young people will have been actively involved in the project over the next 15 years....

"...Again in conjunction with the FAO we have recently organized world conferences on sugar cane and rice, bringing together international experts in the cultivation, harvesting, transport and storage of those crops. The conferences identified the areas vital to increasing productivity and produced recommendations which represent the thinking of the most experienced scientists and technicians in the field.

"Of course, we have a vested interest in the two crops. For nine years we have been studying sugar cane harvesting; for five, the problems involved in rice harvesting. At the present time we are prototype-testing sugar cane harvesters and rice combines suited to the conditions typical of the developing regions.

"This brings me back to a question which has troubled manufacturers for years -- the type of equipment which should be supplied to the developing countries. It is often stated that since land holdings are very small, it is correspondingly small power units which are required.

"Our own studies indicate that small power units are as relatively unproductive for the user as they are uneconomical for the manufacturer, and this conclusion is reinforced by an independent study carried out recently by Arthur D. Little, in Japan, West Pakistan and the Philippines. Even if small power units could be economically produced, it is doubtful whether they would do more than help bolster for a short time an agricultural system which is fundamentally not viable. The small size of farm units in many developing countries is one of the main reasons for their poor productivity, and they will have to be consolidated into more economical units before productivity can be significantly increased.

"Again, in arid and semi-arid soil conditions, one frequently encounters resistance of 16 p.s.i. or more in breaking ground in readiness for the rainy season. A small tractor cannot cope with this: a basic minimum of power is required for plowing at a depth adequate, for example, to provide water storage. Shallow plowing can lead to dangerously low yields in countries, like India, with marginal animal traction.

"A Rockefeller specialist has recently noted that in

India, the cost of a 30 h.p. tractor is lower than the combined cost of a 10 h.p. tractor and a pair of good bullocks. The cost of running a 30 h.p. tractor, in terms of horsepower hours, is lower than that of either the small tractor or a team of bullocks.

"It follows that if the additional power can be fully exploited, the larger machines are more economical. That proviso, however, is very important, and it indicates another area in which we equipment manufacturers can contribute effectively. By cooperating fully with agency specialists and others, we can help determine how environmental factors -- terrain, soil conditions, climate and even seed varieties -- can influence the choice of machines to provide optimum results.

"Quite often, for example, in order to obtain higher or more consistent yields, it is necessary to improve water infiltration and soil conservation with operations like sub-soiling or ridging -- operations which call for more power than can be provided by animals or light tractors.

"I talked earlier about the need for establishing the right economic "mix" in any one country, as a prerequisite towards determining the appropriate degree of farm

mechanization. This principle has all the force of logic, and should normally be adhered to. But sometimes logic is neither sufficient nor necessary. You don't give a lecture on hydrology to someone dying of thirst in the desert. The gap between food productivity and world population growth is the overriding factor, and it will almost certainly lead to mechanization in instances where, from a strictly economic point of view, it would have to be considered premature. It is doubtful whether current birth control practice will begin to have a discernible effect on population growth until the end of the century. Long before then, the capacity of the advanced countries to meet emergency food requirements will probably be exhausted. Force majeure will impel us to abandon all principles of economics and mathematics and move, if not heaven, then certainly earth, and that in vast quantities, in order to fill hungry bellies. In those situations advanced equipment will play a dominating part.

"For example, there are perhaps half a billion acres of land in the world today unfitted, for reasons of soil and climate, for supporting a settled rural population, but which could grow food if food had to be grown regardless

<u>of availability of local funds</u>. This land is to be found south of the Sahara, in Northern India, in parts of Latin America, including Argentina and Uruguay, and elsewhere. Low rainfall and adverse soil and climatic conditions demand power and speed in both tillage and harvesting operations -- power and speed that only large machines can provide. Of course, a basic and expensive infrastructure would have to be created before this dry land farming, or mining, could get significantly underway. Perhaps five or six billion dollars would be required to finance the operation. But those 500 million acres are capable of producing 100 - 150 million tons of grain a year -- more than ten times India's annual deficit.

"Fortunately, much of the experience gained in North America, Australia and South Africa could be applied direct to the conditions I have been discussing (farming after all can be pretty rugged around Medicine Hat). Many fine preparatory studies of specific ecological conditions have already been carried out by organizations like the Rockefeller Foundation and FAO. If the money is ever made available (and the funds required amount to no more than one half of one percent of the gross national product of the

> major aid-giving countries) we equipment manufacturers will be geared to move in fast and help produce an immediate return. We like nothing more than conditions in which power can be fully exploited....
>
> "I would say that we equipment manufacturers must provide a comprehensive advisory service, contribute to basic education regardless of short-term rewards, and maintain continuous product development which takes into the account the findings of ecologists and others in the attempt to open up new acres of the world for food production, and maximize yields in the land already under cultivation."

The above passages, MF believes, clearly establish the company's viewpoint toward means of increasing agricultural production in emerging countries and its associated opportunities and obligations.

The Advantage of Scale

A major characterstic of the MF organization which will enable the company to advance its international enterprise is the size the company has already achieved. Within the next five years, MF believes that total free world farm machinery sales will increase about 30 percent. Massey-Ferguson's size will enable it to bring the financial and managerial resources to bear most efficiently in developing new and expanding markets. To compete in these

markets, which will total about $9 billion by 1971, means massive expenditures for research and engineering, modern production tools and all the marketing actions required to provide potential customers competitive farm machinery which will fulfill their needs.

In the process of developing its international structure, MF has become one of the largest corporations in its industry. It demonstrates, in marked degree, the three characteristics of the large, modern, industrial enterprise: integrated manufacturing and marketing supported by similarly integrated service functions; highly developed concepts and techniques of organization; and international scope of operation.

Optimum Size through Integration

The process of manufacturing and marketing integration is itself the mechanism by which the optimum size of an industrial enterprise is achieved. Integration is made possibly by the expansion of the market being served and, more significantly, by the international expansion of an individual corporation's market area. As mentioned earlier, MF's non-Canadian sales increased from 65 percent of total sales in 1939 to 90 percent in 1966 (in dollars the non-Canadian sales increase was from $13.6 million in 1939 to $835.8 million in 1966). On the manufacturing side of integration the minimization of production costs by deploying manufacturing facilities in 15 countries has increased

MF's competitive abilities.

After the Massey-Ferguson Limited change of management in 1956, the company became fully committed to deploying its manufacturing operations internationally. This minimized production and transportation costs and helped protect its markets.

Protection of foreign marketing areas, however, was no longer the sole or major criterion for manufacturing expansion. If a part of the company's export market could best be served by additions of plant facilities in the United Kingdom or France rather than in Canada, such additions were made. For example, it was not the threat of trade barriers that led the company to purchase tractor and engine manufacturing facilities in the United Kingdom in 1959; it was a need for facilities there in accordance with the MF concept of decentralized manufacturing and marketing.

On this continent, it was the absence of a trade barrier with the U.S., i.e., the so-called common market in farm machinery with the U.S., which permitted MF to build the North American Combine Plant in Brantford. Slightly less than 30 percent of the production of this facility goes into the Canadian market. Similarly, machinery produced by the French subsidiary is sold in Scandinavia, Germany, Australia and Italy. At the same time Italian-built products go to South Africa, Yugoslavia, Germany and France.

The Basis of International Flexibility

Massey-Ferguson's centralized engineering control, necessary to accommodate the needs of the diverse markets, has brought about a degree of MF product standardization and international component interchangeability said to be unrivalled in this or any other manufacturing industry.

Massey-Ferguson, for instance, could take a transmission made in Sao Paulo, an engine manufactured in France, put them with sheet metal parts from England and assemble a tractor to specification in Detroit; or alter the mix and include other factories in Italy, Mexico and India. Such flexibility has obvious benefits in reducing production costs and increasing production control, for it permits long production runs in the most economic facility. These manufacturing facilities are strategically positioned, particularly in Europe, to take advantage of almost any tariff structure or trading bloc. This also means that MF assets are concentrated in the more stable economic and political areas of the world. In October 1966, MF's total assets were $845.8 million, of which $382.4 million, or 45 percent, was in North America; $345.1 million, or about 41 percent, was in Europe; $44.7 million, or about five and one-half percent, was in Australia; and the balance of $73.6 million, or about eight and one-half percent, was in Latin America, Africa and Asia.

Customer Benefits from MF's International Integration

The benefits of international operations to both the company and to its customers, because of economies of scale, are obvious. The customer, however, benefits in other ways. He can benefit from the availability of standardized machines and replacement parts produced in various countries. He is not ultimately dependent on any one manufacturing facility for his replacement parts; his supply of machinery is not decisively threatened by local political or economic disruptions; and finally, his choice of machines is much greater than it would be if restrictive trade measures forced him to rely entirely on local production.

Thus, both the company and the consumer benefit from the flexibility inherent in the company's integrated international manufacturing and marketing complex. Significantly, this flexibility enables the company to adjust to changing tariff patterns and other trade restrictions by appropriate selection of manufacturing sites and by continuing adjustments of the degree and intensity of manufacturing at those sites. In this way, the company attempts to minimize the cost of its products despite changing trading areas or tariffs imposed by governments.

The international rationalization of manufacturing and marketing, the organizational structure required to manage such a worldwide enterprise and the company's products themselves all contribute to the ability of the

present worldwide group of MF companies to do business today in 166 countries and territories and to maintain its leadership as the world's largest manufacturer of tractors, combines and diesel engines.

* * *

This chapter has attempted to explain, in substantial detail, the basis upon which MF operates its worldwide enterprise. In sum, it is the company's view that its functional rationalization creates a crucial distinction between MF and many other large organizations whose headquarters are on this continent: MF is a planned multi-national manufacturing and marketing structure. As such, it is geared to the needs both of the individual agricultural areas in which it operates and to universal agricultural needs. It is not -- like many North American companies -- a company with some overseas dependencies or appendages.

Within this total worldwide structure, MF operations in Canada play an important, but by no means dominant, role. The present MF structure is eminently suited to the execution of the tasks that confront it. To a considerable extent, this capability derives from the wide variety of talents, viewpoints and experience -- far exceeding the traditional bounds of the farm machinery industry -- that new members of MF management have contributed over the last 10 years.

Massey-Ferguson believes that its combination of management skills operating within its continuously evolving organizational framework produce for it and for its customers the maximum in presently attainable efficiency. This is not to say that MF has solved all the problems of international trade. But MF does believe it has developed an approach to international business -- and an ability to adapt itself to the requirements of international business -- which enables MF to accommodate the needs of the world's farm machinery markets.

Chapter III

NORTH AMERICAN STRUCTURE

Massey-Ferguson Limited has eight active direct or indirect subsidiary companies in Canada and the United States, (exclusive of the engine subsidiaries). Five of these are incorporated in Canada and the remaining three in the United States. They are:

Canada:

-- Massey-Ferguson Industries Limited (Toronto), which has the following subsidiaries:

- Massey-Ferguson Brantford Limited (Brantford);
- Sunshine Office Equipment Limited (Waterloo);
- Art Woodwork Limited (Montreal);
- Massey-Ferguson Finance Company of Canada Limited (Toronto).

U.S.

-- Massey-Ferguson Inc. (Des Moines, Iowa) which has the following subsidiaries:

- Badger Northland Inc. (Kaukauna, Wisconsin);
- Massey-Ferguson Credit Corporation (Springfield, Illinois).

Non-Agricultural Products

Although several of these companies do not manufacture or market farm machinery, for the sake of a clear understanding of the management of the North American farm machinery group, it is necessary to describe them briefly.

Sunshine Office Equipment joined the MF group of companies in 1955 with the purchase of H.V. McKay Massey-Harris Proprietary Limited of Melbourne, Australia, Sunshine's principal shareholder. It is the leading steel office equipment manufacturer in Canada. It produces a full line of steel office furniture, metal partitions and storage equipment, including steel shelving and lockers, steel garage doors and steel stampings. It employs about 550 people.

Art Woodwork Limited, Montreal, Quebec, became a subsidiary of Massey-Ferguson in 1964. It produces a full line of wooden furniture for offices, laboratories, libraries and other institutions, and is a leading exporter of furniture as well as stereo and hi-fi cabinets to the United States. Art Woodwork sells through dealers across Canada and through sales representatives in the United States. It employs about 290 people.

Another subsidiary, Badger Northland Inc., manufactures its own line of farm machinery and produces the MF line of suburban or lawn and

garden tractors. The basic Badger Northland line of farmstead equipment includes barn cleaners, silo unloaders, feeding and handling systems and forage harvesters.

Badger Northland joined the MF group of companies in 1965 when MF purchased its assets. It continues, however, to operate under the corporate name of Badger Northland Inc. and is managed as a separate operation. However, it is integrated into MF's day-to-day North American manufacturing and marketing operation because it produces certain products marketed under the MF name. Badger Northland Inc. employs about 500 people.

As indicated above, there are two subsidiary finance companies in North America, one in Canada and one in the U.S., the functions of which shall be described in chapter X.

As in the case of the worldwide enterprise, the MF legal structure in North America, embodied in the companies mentioned above, is the channel through which MF exercises ownership control. The organizational mechanisms managing these companies, however, are known as operations units.

In North America, MF has both a farm machinery group and an industrial and construction machinery group. Serving the financial needs of both

groups is a North American Finance Operation.

For the sake of simplicity, and since this brief is submitted with prime reference to farm machinery, the terms "North American operations", "the operations unit", "North American management", etc.,as used here will refer to the farm machinery group - North America, unless otherwise specified.

One Executive Group for North American Operations

The senior farm machinery group executives are the functional "directors" of the farm machinery group - North America. As such they head their own specialized staff departments which individually serve the needs of both Massey-Ferguson Industries Limited and Massey-Ferguson Inc. These functional directors are accountable for their respective staff specialties throughout the farm machinery group - North America. (These responsibilities are discharged through departments: manufacturing, marketing, personnel and industrial relations, engineering, public relations, management services, comptroller and planning and procurement. The detailed responsibilities of these departments will be covered later.)

As noted earlier the furniture companies, Sunshine Office Equipment Limited and Art Woodwork Limited, are separate legal entities. Functionally, they are also distinct from the day-to-day operation of the

farm machinery group - North America. In essence, the furniture companies are managed as separate operations, distinct from Massey-Ferguson Industries Limited and Massey-Ferguson Inc., by senior executives and their staffs resident at their respective locations. The same is true of MF's plant at Fowler, California which produces western-type implements, although its manufacturing is integrated with the other MF plants. The top officials run their own operations in coordination with the senior executives of the machinery group - North America mentioned above.

In a sense, the top officials at Badger Northland, the furniture companies and Fowler enjoy the same relationship to the North American farm machinery operations unit as that operations unit enjoys in relationship to the parent company's farm machinery group in Toronto. Stated another way, this relationship is an extension of the MF's philosophy of decentralized manufacturing and marketing, and it is employed for the same reasons. The senior executives of the farm machinery group - North America, similarly, are responsible to advise and assist Badger Northland, the furniture companies, and Fowler.

North American Coordinating Committee

The general manager, farm machinery group - North America, the eight department directors, the general attorney, the presidents of Badger Northland and the furniture companies and the general manager of the

Fowler operation constitute the North American management or coordinating committee. In effect this is a cabinet which coordinates and directs the activities of the MF companies in North America. Only the general manager, farm machinery group - North America, the eight functional or departmental directors and the general attorney, however, have North American-wide responsibilities. The other members of the North American coordinating committee have either national, regional, or individual company responsibilities.

The general manager, farm machinery group - North America, heads the North American coordinating committee. He is chairman of Badger Northland and the furniture companies and president of Massey-Ferguson Inc., Massey-Ferguson Industries Limited and Massey-Ferguson Brantford Limited.

Until November 1966, the North American coordinating committee was responsible for the manufacturing and marketing of industrial and construction machinery (ICM) in North America. This responsibility -- with the exception of ICM sales in Canada-- has now been assumed by a new operations unit known as industrial and construction machinery group - North America.

The establishment of this group is presently in an evolutionary stage which tends to obscure some of the distinctions that will exist between

the two product groups in North America. Industrial and construction machinery operations in North America will be treated separately and at greater length in chapter XI.

FUNCTIONAL ORGANIZATION

The underlying concept of the worldwide MF enterprise calls for decentralized manufacturing and marketing. Accordingly, production and marketing responsibilities are assigned to largely self-contained operations units in each country or geographic area where the company owns manufacturing facilities.

As explained earlier, each worldwide product group (farm machinery, industrial and construction machinery and engines) has or will have operations units established on a geographical basis; this means that within the same country or geographic area there might be two or even three separate operations units --as illustrated earlier in the case of the farm machinery group - North America and the industrial and construction group - North America.

The structure of Massey-Ferguson in North America may be viewed from a variety of standpoints. Among them are: delineation by legal entity; by operations units; by functional departments within an operations unit; by geographical location of physical facilities. With the excep-

tion of functional departments within an operations unit, these elements have already been described.

The farm machinery group - North America is organized primarily along functional lines, as are all other operations units. This group comprises eight functional departments: manufacturing, marketing, engineering, planning and procurement, comptroller, personnel and industrial relations, public relations and management services. The first four are usually considered operational functions as opposed to the service nature of the remaining four which basically support the operational functions.

The following is a description of the prime responsibilities of each of the functional departments of the farm machinery group - North America.

Manufacturing

This department is responsible for the manufacture of components and their assembly into wholegoods and for the manufacture of company-produced parts. In discharging these responsibilities, it coordinates closely with other departments: engineering, particularly when entering into the manufacture of new or modified products; marketing, with particular regard to the timing and volume of production; and planning and procurement, with special regard to ensuring the timely provision

of factory inputs and the availability of finished products or components for movement to customers or other factories.

To assist him in the execution of his responsibilities, the director manufacturing has both staff and line subordinates. His staff includes specialists in industrial engineering, facilities planning, material handling and packaging, plant engineering, production control, pre-production planning, production engineering and quality control. Line subordinates are the general factory managers ot North American facilities.

To enforce rigorous standards of quality, the farm machinery group - North America operates the North American Quality Control Centre. This laboratory's main purpose is to test mass-produced parts to ensure they meet specifications and have the required reliability characteristics.

Overall, the director manufacturing is responsible for recommending manufacturing objectives, strategies, policies and programs and communicating them as approved to his subordinates; reducing manufacturing costs; and planning for and providing new manufacturing plant facilities in North America.

In North America, MF has 12 plants which primarily manufacture components and/or assemble finished or partially finished farm and

industrial and construction machinery, farmstead equipment and replacement parts. Four of the plants are in Ontario; three in Wisconsin; two are in Michigan and there is one each in California, Iowa and Ohio. These plants, their activities and interrelationships, are described, at length, in chapter IV.

Marketing

The overall goals of this department --implicit in the definition of marketing as all those activities necessary to place goods in the hands of the consumer, but excluding physical manufacture and distribution--are broken down into product planning and management, retail development, field services and sales organization responsibilities.

Planning includes marketing research, forecasting and development and maintenance of long-term product line strategies and short-term product marketing strategies that enable the company to satisfy customer needs for wholegoods and parts.

The planning function has product experts who help plan the improvement of existing machinery and coordinate the development of new machinery. These product planners work closely with counterpart marketing planners. Both draw upon the expert knowledge of the department's market and economic researchers. These market researchers, who are professional economists, determine trends in demand for each category of machinery,

analyze changes in the company's market position and assess trends in competitive machinery.

A second specialized marketing-type area of responsibility is field services. The objective of field services is to develop product and service training and product distribution which will help the field sales organization to achieve its marketing goals. To achieve these objectives, the company employs experts in distribution and machinery servicing control. These maintenance experts help instruct dealership maintenance personnel and assist them in solving machinery maintenance problems in the field. These activities, and other services rendered dealers and their customers, are treated in detail in chapter V on marketing.

A third specialized function within the marketing department is retail development. Here the goal is to increase the strength of the MF retailing organizations, expand MF representation in existing high potential areas and anticipate changing customer profiles and purchasing behavior. To achieve these goals, this division has experts in dealer development, business management training, dealer placement, retail merchandising and the operation in the United States of company-owned stores.

The final marketing element is, of course, the field force itself. This is organized on a geographic basis and subdivided into five sales

divisions based on similarity of crops, of seasonal characteristics and of machinery requirements. One of the sales divisions encompasses all of Canada. Branches in Canada are located in Montreal,Toronto, Winnipeg, Saskatoon and Calgary. Sub-branches are located at Moncton, London, Regina and Edmonton. (These and other field sites in Canada are discussed in chapter V.)

At each branch, in addition to the branch manager, typically there are sales, distribution, administration and service managers. Some branches also have dealer development and industrial and construction machinery sales managers. (Branch functions and a newly introduced regional sales office concept --which may replace the branch concept-- are fully discussed in chapter V.)

Operating in each branch area are district managers. Each district manager lives in the region where the 8 to 12 dealers he serves are located. The district manager is MF's primary point of contact with its dealers. He assists them in all facets of their business including sales promotion, direct retail selling and business management. The dealer also receives advice on service problems from a service representative who operates from the branch office. In all, some 20 branches in Canada and the U.S. serve approximately 2,500 MF dealers.

This, in brief, is the head office and field structure through which the director marketing works to achieve his sales objectives. Marketing

functions and programs are discussed, with emphasis on Canada, in chapter V.

Engineering

The engineering department of the farm machinery group - North America functions as an organic part of MF's total worldwide engineering resources. It is only through the parent company's strong, central coordination of these resources that the necessary commonality and interchangeability of machinery components can be achieved --while still preserving sufficient design flexibility to meet local requirements.

Centralized coordination also provides economies of time, money and engineering talent by eliminating the necessity for each operations unit to engineer its entire product line. Centralized coordination places the expertise of any and all MF engineers at the disposal of the entire worldwide enterprise, eliminates the possibility of unknowing duplication of engineering projects, permits the concentration of the company's best engineering talent on its most difficult problems and on those projects of greatest potential value.

Operating within this framework, the engineering department, farm machinery group - North America, advises marketing's product planners on the technical feasibility and design costs of new machinery being considered. The engineering department performs the analyses and gathers the information necessary to translate marketing's general

requirements, such as speed, capacity, range of operating conditions, approximate selling price, etc., into a detailed product definition. These product definitions include such information as basic dimensions, weight, power, specific features and cost targets for manufacturing and tooling.

The engineering department, notwithstanding its close relationship with the parent company, is completely responsible for the products which originate in, and are for, the North American market. The department provides the manufacturing and test specifications for parts, components and sub-assemblies. It puts critical parts through rigorous reliability testing as part of the product engineering function before production model manufacturing. The company's various testing programs are explained in chapter IX on engineering.

To discharge its responsibilities, the North American engineering department is staffed with professional engineers. Among them are specialists in standardization, service coordination, engineering research, tractor design, combine design, implement design and laboratory testing and field testing.

Planning and Procurement

This department performs logistic functions. It is basically responsible for developing and adjusting manufacturing programs to meet predicted sales volumes; purchasing from outside suppliers; arranging for the

supply of components both within North America and from overseas to fulfill established manufacturing programs; ensuring the proper flow of finished goods to the customer; and overseeing the provisioning and distribution of replacement parts.

All of these activities are accomplished within the framework of inventory levels established by line management.

To discharge these responsibilities, this department has four sections which have specific responsibilities for purchasing, program planning, traffic, wholegoods supply and parts supply.

Purchasing:

- develops and recommends purchasing policies and programs;
- determines instances where centralized purchasing provides an advantage and undertakes such action;
- keeps abreast of market and pricing trends potentially affecting MF manufacturing inputs and other purchases;
- provides guidance and assistance to line purchasing functions;

- develops and applies cost reduction programs and techniques;

- establishes and ensures the maintenance of good company relations with suppliers;

- coordinates the preparation, analysis and submission of purchasing data required for product development, product programming and other management studies.

Program Planning:

- develops and recommends production programs that meet the domestic and export sales forecasts, that are compatible with internal manufacturing and/or outside sourcing facilities, and result in acceptable inventory levels;

- maintains follow-up on factories and outside sources on their performance to program;

- coordinates component and wholegood orders to and from export and other operations units.

Traffic:

- develops and recommends traffic policies and programs;

- coordinates traffic and transportation activities to provide the most effective and economical system possible;

- provides advice on tariffs, contracts, regulations and other federal or provincial legislation as they effect company operations;

- conducts or coordinates negotiations with traffic committees, commissions such as the Canadian Transport Commission and the Interstate Commerce Commission, rate-making organizations and carriers to effect improvements in rate and/or conditions affecting the company's transportation costs;

- manages factory traffic departments;

- develops techniques for analysis of freight costs on company products.

Wholegoods Supply:

- develops and recommends machine distribution policies and programs;

- recommends optimum locations for new machine distribution warehouses;

- develops total distribution implications of all proposals relating to machine packaging, warehousing and transportation;

- manages machine warehouses;

- develops techniques for analysis and evaluation of inventory level standards and turnover rates;

- prepares detailed inventory forecasts for MF's North American inventories.

Parts Supply:

- develops and recommends parts supply policies and programs;

- manages master parts warehouses;

- coordinates parts supply distribution to achieve the best possible parts availability consistent with sound economic practices;

- directs parts procurement activities from factories, outside suppliers and other operations units;

- coordinates the timely preparation, production and distribution of parts books.

Comptroller

The basic role of the comptroller is to furnish North American management with the financial tools needed to plan their activities and to make decisions. He establishes information requirements for and coordinates the development of financial plans. He analyzes performance against approved plans for the manufacturing, marketing and planning and procurement departments. He coordinates the development of machine pricing proposals to see they adequately meet costs and profitability objectives. He recommends alternate pricing if appropriate. In the execution of these responsibilities, the department's financial forecasting capability, and its analytical abilities with respect to asset utilization, are of critical importance.

He implements accounting policies and maintains financial data to satisfy statutory requirements and the requirements of North American management. He conducts audits, handles all tax matters and negotiates customs duties. He develops and recommends accounting procedures for factories, warehouses, branches and company-owned retail stores and evaluates the effectiveness of these and other comptroller-type activities in those locations. He coordinates the development of standardized procedures as appropriate.

To discharge those responsibilities, the comptroller department requires experts in accounting, manufacturing analysis, financial analysis, tax,

insurance, planning and control, financial forecasting and financial resource utilization.

<u>Personnel and Industrial Relations</u>

The director personnel and industrial relations is responsible for recommending personnel and industrial relations policies and programs in conformance with the parent company's guidance and, when accepted, ensuring that line managers adhere to them.

Among personnel policies, perhaps the most important are those that attract talented people, particularly competent managers. Once attracted through the department's recruiting program, they must be held through the promulgation and enforcement of policies for effective employee use and development.

The director personnel and industrial relations' responsibilities also include developing and coordinating an industrial relations program and the negotiation of labor contracts. In so doing he must ensure that his bargaining practices and provisions are compatible with the interest of the worldwide enterprise.

To assist him in the discharge of his responsibilities, the director's staff includes experts in recruiting, employee benefits, salary administration, wage administration, personnel research and practices, and

industrial relations. In addition, the director has a staff relationship with personnel and industrial relations managers who are resident at the company's manufacturing sites.

The long-term success of the company is substantially influenced by the success of the personnel and industrial relations staff in helping acquire management personnel. The director personnel and industrial relations and his staff also contribute to the company's long-term welfare through their conduct of all forms of labor relations.

Public Relations

As an international enterprise seeking to serve and sell products in most parts of the free world, Massey-Ferguson has long recognized the desirability of and the need for good corporate communications to avoid misunderstandings and misconceptions concerning its operations and goals. This is particularly true in the complex society of North America where, for instance, in the area of government relations, the company, because of its Canadian and U.S. operations, deals with 62 major governments; two federal and 60 provincial or state.

The director public relations is responsible for the development, implementation and coordination of communication programs that will keep the company's many publics, whether in the private, government or academic area, informed about the company's policies, viewpoints, operations and goals. The department, for which he is responsible, uses all

forms of communication to achieve this objective: factory and office tours, seminars, special events, booklets about company facilities and history, corporate (institutional or non-product) advertising, teaching aids, films, speeches, all forms of written and pictorial materials for media, briefs and, on occasion, special presentations to specific groups.

The company's internal publics, its own management and employees, are as important as any of its external publics. To keep its internal publics informed, the public relations department establishes or assists line management in individual functions to establish continuing information programs --which may be written or oral-- for management, employees and dealers about company and industry activities, objectives and viewpoints.

While the primary concern of the company's management is to operate the company efficiently as a profitable enterprise that provides continuing employment, good products and a reasonable return to its shareholders, it also accepts that, as a corporate citizen, the company and its management have a role to play in society other than the primary economic role. This role as a citizen is actively assumed through personal participation by management at all levels in many areas of social, educational and cultural activity; by corporate financial support of institutions and projects, such as universities, hospitals, art centres and the United Nations Food and Agriculture Organization (FAO), and by

the provision of professional assistance and advice. The director public relations is responsible for the development and coordination of such activities.

The company carries on a large-scale program of financial and personal (through management and public relations personnel) assistance with institutions of higher learning, agricultural organizations, industry associations, professional groups and associations and youth groups. These programs are directed towards youth leadership education, professional improvement, agricultural education and advancement and general scholarship assistance. In North America these programs are developed and coordinated through the director public relations.

Management Services

This department is primarily concerned with assisting other North American departments in the application of management science techniques which will extend their operational capabilities. Management services go far beyond the traditional systems and procedures function. This is especially true in its use of computer technology and operations research to accelerate the flow of information to improve management's decision-making capabilities.

To assist in discharging its responsibilities, management services includes sections individually responsible for communications systems, operations research and systems, and data centre operation. The following

outlines their individual responsibilities.

Communications systems:

- continually reviews existing message, data, voice and other communications facilities, services, systems and practices in all North American locations; plans and recommends, and upon approval, schedules and supervises improvements to reduce costs;

- in conjunction with the operations research and systems staff, develops, recommends, and upon approval, supervises, coordinates or assists in the implementation of the communication and teleprocessing phase of all systems projects;

- provides technical consultation to all North American functions on improved communications methods and costs;

- ensures that the company's communications practices, services and costs selectively reflect developments in the telecommunications art;

- develops and maintains a telecommunications manual and ensures that the operators are properly trained in following its procedures.

Operations research and systems:

- develops, obtains approval and maintains control of realistic long-range business systems, concepts and plans;
- implements operations research and business systems development;
- maintains a balanced and economic use of all North American teleprocessing facilities by integrating the development of new computer systems and the maintenance of existing computer systems with planned software and hardware availability;
- maintains competent project administration with controls on time and cost performance, quality and directions of effort;
- audits regularly all systems and procedures in North America to ensure that they are current, up-to-date and reflect the most effective and economical methods;
- ensures a consistent approach to information processing throughout North America by the use of procedures, standards, documentation, training and control;

- determines data processing equipment needs and specifications for North America and directs their implementation.

Data centre operation

- plans, schedules and controls work in North American data centres in order to maintain efficient use of manpower, supplies and equipment;

- provides information processing within approved time schedules;

- recommends computer equipment, supplies and service appropriate to data centre work loads; evaluates all related modifications and expense plans;

- maintains internal operational procedures and standards for North American data centres; recommends and assists in implementing similar operation procedures and standards at other data centres;

- maintains work standards and related performance measurements.

These data centres are in Brantford, Toronto, Detroit and Des Moines.

CANADIAN, U.S. AND WORLDWIDE COMPARISONS

The following table shows factory floor space figures for the years 1957 - 1966 inclusive, and the total number of MF employees worldwide. These figures exclude the footage and employee figures of associated companies but do include Perkins, furniture and industrial and construction machinery manufacturing figures.

Plant Footage in Thousands of Square Feet*

Year	Canada		U. S.		Outside North America		Worldwide Total	Employees Worldwide+
	Square Feet	% of Total	Square Feet	% of Total	Square Feet	% of Total	Square Feet	
1957	3,708	32.1	3,161	27.3	4,691	40.6	11,560	21,481
1958	3,725	40.8	815	8.9	4,597	50.3	9,137	23,808
1959	3,733	33.1	815	7.2	6,747	59.7	11,295	29,955
1960	3,733	30.7	866	7.1	7,563	62.2	12,162	35,376
1961	3,178	26.4	733	6.4	8,124	67.2	12,035	38,397
1962	3,690	29.3	733	6.1	8,183	64.6	12,606	39,806
1963	3,739	29.2	733	6.1	8,331	64.7	12,803	41,089
1964	3,863	28.3	1,167	8.5	8,624	63.2	13,654	42,927
1965	3,895	25.4	1,970	12.8	9,504	61.8	15,369	45,667
1966	3,591	24.2	1,970	13.2	9,454	62.6	15,015	46,242

* Exclude associated companies. Figures include associated warehousing, office and engineering space.

\+ Figures are yearly averages.

Total factory footage worldwide has grown more than 30 percent during these 10 years; an increase needed to serve growing markets and maintain the company's position as the world's largest manufacturer of tractors, combines and diesel engines in numbers of units produced. This increase has all been overseas, especially in Europe, and has enabled those factories, among other things, to serve the farm machinery needs of the export territories.

In North America footage has decreased both in Canada and the U.S. but conforms to market needs on this continent. The decrease has also been caused by the more efficient use of production facilities on this continent. In Canada, factory footage has declined about three percent; in the U.S. there has been a net decrease of about 38 percent.

In relationship to the world total, Canadian footage has fallen six percentage points since 1957, and U.S. footage has declined 14 percentage points. U.S. factory footage represents only half the space in relationship to the total worldwide enterprise that it did in 1957. Over the 10-year span, Canadian footage has averaged 30 percent of the worldwide total and the U.S. 10 percent of the total.

Overall, these figures reflect the relative shift of emphasis of the company's sales from North America to overseas areas. In view of accelerating demand for farm machinery in the developing nations, it is reasonable to expect this trend to continue.

As of October 31st, 1966, the worldwide total of employees was 46,040. This number breaks down as follows:

Number and Percentage of Employees by Country - 1966

Country	Number	%
United Kingdom	18,803	41
Canada	7,810	17
France	5,746	12
U.S.	4,914	11
Germany	2,640	6
Australia	2,288	5
South Africa	1,454	3
Brazil	1,249	3
Italy	1,112	2
Other	24	-
	46,040	100

In 1966 the company had 7,810 employees in Canada. They represented 17 percent of the total. In 1954, MF had 6,505 employees in Canada, who represented 34 percent of the total. In the same year MF had 4,275 employees in the U.S., compared to 4,914 in 1966. Thus the Canadian increase, 1,305, is more than twice the U.S. increase, 639. It is, however, unrealistic to suggest that these figures reflect anything more

than MF's judgment over that period of time as to the most economic locations to produce products for its markets. Future circumstances will dictate decisions on similar matters.

The next table shows MF's net sales in Canada, the U.S. and the remainder of the world. It is perhaps instructive to note that while Canada has three out of every five MF employees in North America, Canada produces only one sales dollar to every three in the U.S. These facts distinguish Massey-Ferguson from its major competitors.

MF Net Sales, 1957-1966

	Total	Canada		U.S.		Other Areas	
Year	$ millions	$ millions	% of Total	$ millions	% of Total	$ millions	% of Total
1957	390.8	41.5	10.9	89.5	22.8	259.8	66.3
1958	420.2	40.3	9.6	130.3	31.0	249.6	59.4
1959	475.5	55.6	11.7	162.1	34.1	257.8	54.2
1960	490.4	61.8	12.6	144.4	29.4	284.2	58.0
1961	519.3	52.5	10.1	136.7	26.3	330.1	63.6
1962	596.1	62.8	10.5	145.1	24.3	388.2	65.2
1963	685.7	76.5	11.2	166.5	24.3	442.7	64.5
1964	772.0	81.6	10.6	188.3	24.4	502.1	65.0
1965	808.5	89.2	11.0	225.4	27.9	493.9	61.1
1966	932.1	96.3	10.4	290.4	31.1	545.4	58.5

* * *

This chapter has described the organization of Massey-Ferguson's operations in North America. The socio-economic characteristics of the sub-markets on this continent, MF believes, are sufficiently similar to justify the integrated manufacturing and marketing it practises. For example, the level of educational achievement and technical competence, the agricultural products and practices found here, and even the climate, in general, display many more common than divergent elements.

In addition, the continent forms a natural physical entity. The continent's transportation facilities, among other factors, enable MF to deploy or redeploy its manufacturing plants and avail itself of the optimum mixture of economic factors.

This ability allows MF considerable advantage in adjusting its manufacturing and marketing operations to the demands of reality imposed upon it. For example, if the company were faced with restrictive or punitive legislation or crippling demands from organized labor, in either Canada or the U.S., it could adjust the main locations of its manufacturing to minimize the damage it would otherwise sustain in the industry's competitive environment. MF can exercise this flexibility in response to both favorable and unfavorable local or regional conditions. This flexibility within North America is further enhanced by alternative company sources of manufacturing from the overseas elements of the international enterprise.

Overall, MF operations on this continent and the manner in which the company is organized to carry them out reflect the parent company's management philosophies. Through the day-to-day implementation of the policies resulting from these philosophies, MF's North American operations contribute to the operating success and profitability of the worldwide enterprise. Stated differently, MF's integrated North American operations contribute substantially --as indicated by preceding tables and charts-- to the results obtained from the total worldwide enterprise. The company believes that its North American structure, in conjunction with other operations units, yields product benefits and efficiencies and helps to channel them to consumers. MF also believes that these benefits and efficiencies exceed those achievable on a segmented, isolated country-by-country basis.

Massey-Ferguson, for example, largely through availing itself of the advantages provided by the common market in farm machinery, has been substantially instrumental in providing Canadian farmers with mechanized farm equipment. The common market has enabled MF to produce for the entire North American farm machinery market, rather than just Canada or the U.S., and to share with the farmer the benefits from the associated economies of scale.

Thus, farm machinery manufactured and marketed on this continent, in conjunction with other essential farming inputs, has, in MF's opinion,

been largely responsible for the growth of Canadian agricultural productivity. MF believes it is questionable whether this growth would have occurred in the same magnitude had the Canadian farmer not been able to purchase farm machinery at par prices with U.S. farmers. The Canadian farmers, insofar as MF is aware, is the only Canadian purchaser of capital consumer goods who enjoys par prices with counterpart U.S. purchasers. He enjoys this advantage in spite of what some observers might consider lower manufacturing productivity in the Canadian farm machinery industry than that in the U.S.

Chapter IV

MANUFACTURING

In North America, Massey-Ferguson presently operates 12 plants engaged in component manufacturing and/or in assembling finished or partially finished farm and industrial and construction machinery, farmstead equipment and parts. They are:

Location and Function of MF's North American Plants

Plant	Location	Function*
Toronto Works	Toronto, Ontario	Sourcing and Assembly
North American Combine Plant	Brantford, Ontario	Assembly
'M' Foundry	Brantford, Ontario	Sourcing
Verity Plant	Brantford, Ontario	Sourcing and Assembly
North American Implement Plant	Des Moines, Iowa	Assembly
North American Tractor Plant	Detroit, Michigan	Assembly
Industrial and Construction Machinery Plant	Akron, Ohio	Assembly and Sourcing
Transmission and Axle Plant	Detroit, Michigan	Sourcing
Fowler Plant	Fowler, California	Sourcing and Assembly

Plant	Location	Function*
Kaukauna Plant #1	Kaukauna, Wisconsin	Assembly and Sourcing
Kaukauna Plant #2	Kaukauna, Wisconsin	Sourcing and Assembly
Algoma Plant	Algoma, Wisconsin	Assembly and Sourcing

* "Sourcing" refers to the manufacture of machinery components while "Assembly" refers to the assembly of sub-assembled and finished machines; the order of listing indicates which is the dominant activity.

The last three of the plants listed are operated by Badger Northland Inc., a wholly-owned MF subsidiary, which possesses its own engineering and marketing staffs. These Badger Northland plants, as mentioned earlier, produce barn cleaners, silo unloaders, tube and bunk auger feeders, chain conveyors, dump carts, handling systems, cleaning systems, mixer mills, wagons, liquid fertilizer dispensers, forage harvesters, corn choppers, rotary mowers, rotary tillers and a garden and lawn special products line including MF's 10- and 12-horsepower tractors.

The Fowler operation which produces implements largely for the western U.S. is operated by its own engineering and manufacturing management.

In addition to the plants listed above, MF maintains its North American Quality Control Centre in Detroit which tests mass-produced parts for

conformance to MF's specifications and reliability requirements.

In the main, the first eight plants listed above constitute MF's mutually supporting network of manufacturing facilities on this continent. This network is also related to other MF plants in other parts of the world.

Toronto Works: this 1.9-million-square-foot factory (which includes some warehouse space) is one of Toronto's largest industrial plants. It employs about 3,000 people. Toronto Works is both a sourcing and an assembly plant. Its machine shop machines many of the components used in other North American plants, the major exceptions being machining of transmissions and axles at the Detroit transmission and axle plant and production of machined castings at Verity. The majority of castings machined in Toronto are received from the 'M' Foundry in Brantford. (Forgings and castings purchased from outside sources are also machined at the Toronto Works.) After machining, they are transshipped to the appropriate assembly plant. Toronto Works performs nearly all sheet metal and other stamping for MF's North American factories. A small portion of the stamping is done by the Sunshine Office Equipment Limited plant in Waterloo, and the Verity plant. Toronto Works is also the North American assembly point for hay balers, self-propelled and pull-type swathers, pickups and axles for combines.

North American Combine Plant (NACP): all of the company's North American combine assembly activity is centred in this Brantford plant. It contains nearly half a million square feet. Completed in 1963, and representing an investment in land, construction and equipment of $13.5 million, it is the company's newest facility in Canada and employs about 1,050 people. Currently, its production includes the MF205, MF300, MF410 and MF510 self-propelled combines and the MF405 pull-type combine. Approximately 25 percent of these is sold in Canada; the balance is sold in the U.S. It receives sheet metal and other stamped components from the Toronto Works, Perkins engines from England and other engines from Canadian suppliers, castings made at the 'M" Foundry and machined at the Toronto Works or Verity. Transmissions and axles come from the 'M" Foundry by way of the transmission and axle factory in Detroit where they are machined, sub-assembled and tested. These are assembled into live axle assemblies at the Toronto Works and then shipped to the North American Combine Plant for assembly into combines.

'M" Foundry: this 192,000-square-foot facility in Brantford is one of the largest and most modern grey iron foundries in Canada. Its 550 employees produce iron castings for MF plants in North America and overseas. Its operations include melting, pouring, molding, cleaning, core-making, pattern-making and sand reclamation. Most of the castings which require machining are shipped to the Toronto Works, or Verity

Works, except for transmissions and axles which are machined at the Detroit transmission and axle plant. From these three plants the machined components are transshipped to the appropriate assembly plant.

Verity Plant: also located at Brantford, this half-million-square-foot facility employs approximately 1,100 employees. They manufacture moldboard and disc plows, some disc harrows, subsoilers, mowers, spring tooth harrows and side delivery rakes. Major manufacturing processes here include arc and submerged welding, forging and press work. Some stamping, particularly on dimension metal, is performed here as opposed to the main stamping operation at the Toronto Works, and there is some machining of certain grey iron and other castings for Detroit and the combine plant.

North American Implement Plant (NAIP): opened in 1966, this 570,000-square-foot factory and warehouse in Des Moines, Iowa, now assembles a variety of machines including cultivators, harrows, cornheads, rotary hoes, some disc harrows, tillers and planters, primarily for marketing in the U.S. Assembly techniques here include use of the argon system for the metal-and-inert-gas welding process. The majority of the components are produced in Canada and are made of Canadian steel. The plant receives castings from "M" Foundry, some of them via the Toronto Works machine shop, and stampings from Verity and Toronto Works. The North American Implement Plant presently employs about 300 people.

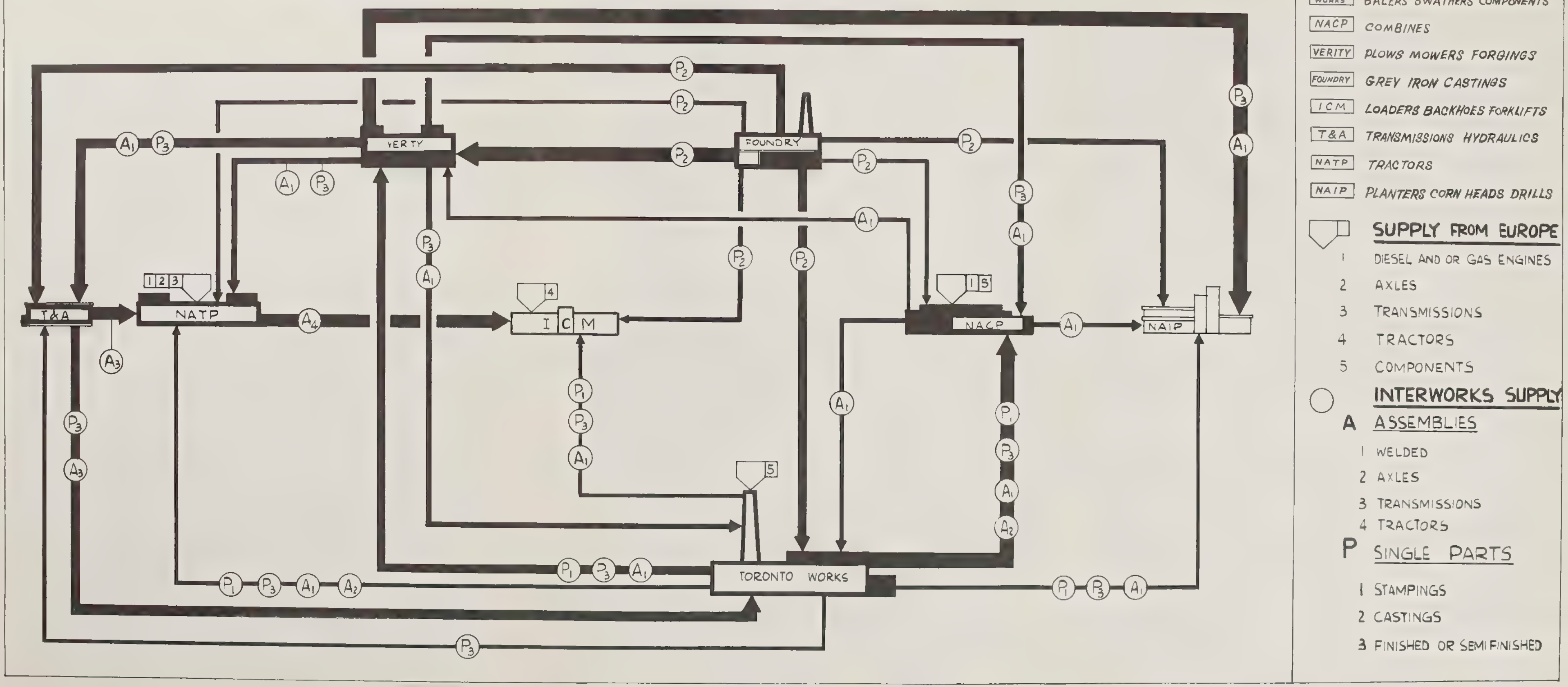
North American Tractor Plant (NATP): the centre of the company's North American tractor assembly operations, this 550,000-square-foot factory is located in Detroit. Approximately 550 NATP employees assemble six basic agricultural tractor models and, in some degree, nine basic industrial tractor models. Agricultural models range from 35 to 120 engine horsepower; industrial and construction models range from 42 to 70 horsepower. The plant receives all of its diesel engines from Perkins in England, stamped metal from Toronto Works, castings from 'M' Foundry, transmissions, axles and associated housings for the large MF1100/1130 tractors from 'M' Foundry via the transmission and axle plant. Axles and transmissions for the MF135, 150, 165, 175 and 180 come from the United Kingdom and France. Sheet metal and many other components are purchased from various suppliers mostly in the United States.

Industrial and Construction Machinery (ICM) Plant: this 349,000-square-foot plant in Akron, Ohio, produces backhoes, loaders, multi-purpose blades, post-hole diggers, fork lifts and logging machinery. The components for the machinery assembled in this plant are sourced, basically, from the same locations as those for the tractors assembled at the North American Tractor Plant. In addition, some are transshipped from the Landini factories in Italy. The plant employs approximately 370 persons.

Transmission and Axle Plant (T&A): this facility machines and assembles tractor and combine transmissions and axles, hydraulic pumps and power steering units, employing about 670 people. Some transmission and axle castings come from "M" Foundry to T&A for machining and assembly; then, with their associated castings, they are transshipped to the North American Tractor Plant or the North American Combine Plant. A few input components for T&A come from France and United Kingdom.

The following fold-out presents further details of the relationships of the plants described above.

MF North American Interplant Relationships



PLANT LOCATION DECISIONS

Historical Survey

In 1872, the old Harris Company moved from Beamsville, Ontario, to Brantford, and in 1879 the Massey Manufacturing Company moved from Newcastle, Ontario, to Toronto. The two merged in 1891 to form Massey-Harris, and in that year acquired the Patterson Wisner Company with plants at Woodstock and Brantford. It was in this way that the company first became established at Toronto, Brantford and Woodstock, and apart from the latter location, which was vacated in 1966, the company's Canadian plants are still located in those centres.

Batavia, New York: the company acquired its first manufacturing facility outside of Canada in 1910, when it purchased a controlling interest in a company at Batavia, New York. The reason for that move cannot be known with complete certainty. But it seems that Massey-Harris feared the consequences of trade reciprocity with the United States, and particularly the competition that might arise from U.S. imports. A plant in the United States, it seems to have thought, would balance the possible weakening of its position in the Canadian market.

Other influences at work were the strength of the Batavia company in exports and the capacity shortage of the Massey-Harris plant in Canada at that time. The new acquisition was profitable during World War I,

but seldom so between the wars, with costs apparently higher than those of the company's Canadian plants. It assembled implements and some pull-type combines.

Weston, Ontario: in 1916 the company purchased a plant at Weston and for a few years it attempted to manufacture tractors there. The project was a failure, apparently because of manufacturing and engineering difficulties; in any case, it seems to have become quite unattractive with the increased flow of tractors from the U.S. after removal of the Canadian tariff on tractors valued at less than $1,400.

Racine, Wisconsin: Weston's failure left Massey-Harris without a tractor and it was principally because MH wished to purchase a tractor, and tractor technology and tractor manufacturing facilities, that it acquired the J.I. Case Plow Works Company at Racine, Wisconsin in 1927. Such technology and facilities were not available in Canada. During World War II the operation at Racine was greatly expanded in order to accommodate the company's tank assembly operation.

Toronto expansion: toward the end of the war, and shortly thereafter, both the Massey-Harris Company and Harry Ferguson Company made plant location decisions that have been of lasting significance. Massey-Harris needed substantial additional combine facilities and having insufficient capital to consider building a completely new assembly plant, it decided

to expand its facilities at Toronto. A location in the U.S. was not seriously considered at that time, possibly because its U.S. plant costs appear to have been higher than its Canadian plant costs and because it had not yet developed a significant position in the U.S. market. And, while the company continued to assemble its pull-type Clipper combine at Batavia, it soon had concentrated most of its combine assembly activity at Toronto ; it continued to locate its tractor assembly operations at Racine; and it manufactured and assembled implements at Brantford, Toronto, Batavia and Racine. After acquiring a small company at Fowler, California in 1948 it also manufactured implements there.

Detroit, Michigan tractor facilities: Harry Ferguson entered into an arrangement with Henry Ford in 1939 whereby the latter would manufacture the small Ferguson tractor at Detroit for the U.S. Ferguson company, Harry Ferguson Inc., located at Detroit as well. That arrangement came to an end in 1946 and Harry Ferguson had to find new manufacturing facilities. It was realized that Ferguson tractors produced in the United Kingdom could be imported into the U.S., but there was a strong feeling that the U.S. farmer would be biased against imported tractors.

After much investigation, it was decided to build a new tractor assembly plant on Southfield Road, Detroit, and this was done in 1948. The merger

with Harry Ferguson in 1953 brought that plant into the Massey-Harris orbit, the latter company, of course, soon becoming Massey-Ferguson Limited. That is where the company's North American tractor assembly activities are now concentrated; the Racine tractor assembly operations disappeared in 1957 when the production of the old Massey-Harris tractors was discontinued.

Batavia and Racine plants closed: after the merger, the company faced a period of unsatisfactory profits and excess capacity, and it decided to ameliorate this condition by closing down some of its old and inefficient plants. The Batavia plant consequently was closed, as was the Racine plant (apart from the parts operation there) and production was moved to the Canadian plants.

In Canada, the Market Street plant at Brantford was closed as was the Woodstock plant later on --both of which were exceedingly old factories.

Having rid itself of a number of inefficient plants, the company could look forward to acquiring more efficient facilities. Expanding sales soon hastened the time when such new capacity would be essential, particularly since the company was also pursuing a policy of increasing the proportion of machine components that it would manufacture itself.

Engines, transmissions and axles: this desire led to the acquisition of: (1) the transmission and axle plant of Borg-Warner in 1957; (2) the

diesel manufacturing facilities of F. Perkins Limited in Peterborough, England in 1959; and (3) the Standard Motor Company tractor manufacturing facilities also in 1959.

The Borg-Warner plant had been supplying the company with major tractor components. The latter two acquisitions arose in part because those companies had already been supplying Massey-Ferguson with engines and tractors, and also because in terms of relative international costs they had attractive manufacturing facilities.

Perhaps the most important plant location decisions for the purposes of the investigation of this Royal Commission relate to the company's tractor and combine production in North America and to its new implement assembly facility at Des Moines, Iowa.

Tractor assembly expansion: by 1957 the tractor assembly facilities at Detroit were clearly recognized as inadequate. During the same year, the policy of using major tractor components manufactured in the U.K. for tractors assembled at the Detroit plant was found to be feasible and was implemented. This had the effect of removing much of the cost disadvantage of the Detroit location vis-a-vis the importation of whole U.K. tractors. Also, it was estimated that the cost of expanding at Detroit would be half that of acquiring adequate facilities at the Racine location, the old Massey-Harris tractor location. Finally, the

"pulling power" of Detroit, from the point of view of the quality of labor and costs generally, especially those relating to production of the sheet metal industry, was a factor.

For all these reasons it was decided in 1957 to expand the company's existing facilities at Detroit. For a period it also contained the company's industrial equipment manufacturing facilities, but this was moved to the newly acquired Oakman Boulevard plant at Detroit in 1964. The move of ICM, together with a further expansion of floor space in 1964, gave the tractor plant its present assembly capacity.

ICM facilities: in 1967 it was decided to move the industrial and construction machinery assembly operations to a newly acquired plant in Akron, Ohio. Tariffs on industrial and construction machinery made it prohibitive, to locate in Canada, a plant catering in a substantial way to the larger U.S. market.

North American Combine Plant: by 1958 the company recognized that it would have to have new facilities for manufacturing the new line of combines it was developing. The Toronto combine facilities had become quite inadequate. Land for a combine plant had been acquired at Brantford as early as 1955, but the company decided that it should commission a new plant location study. Consultants were retained in March 1960 and instructed to determine the most economically appropriate location for the plant. The subsequent study was based essentially on an appraisal

of relative freight costs (inbound and outbound), utility costs, labor costs and taxes at Denver, Colorado; Wichita, Kansas; Des Moines, Iowa; Memphis, Tennessee; Minneapolis, Minnesota; Chicago, Illinois; Cincinnati, Ohio; and the Toronto area.

In the end it was shown that the Toronto area was the most attractive from a cost point of view and so it was decided to build the present NACP facility on the Brantford land purchased in 1955. This decision rested on the finding that relatively lower wage costs would more than offset disadvantages of freight and other costs, and on the assumption that the wage differential --Canadian rates below U.S. rates-- which had existed for a long while would change only with an improvement in productivity to compensate for it. Significantly, the figures in the study showed that if labor costs were assumed to be the same in the Toronto area as in the U.S. then there would have been a cost disadvantage to locating in Canada as compared with locating at Des Moines, Iowa; Chicago, Illinois and Cincinnati, Ohio.

Des Moines, Iowa: finally, there is the 1965 decision to move some Massey- Ferguson senior management to Des Moines, Iowa, and to establish an implement assembly operation there. Subsequently, the principal office of Massey-Ferguson Inc. was moved from Detroit to Des Moines. It had been felt, with the passage of time, that the relative lack of an MF corporate presence in the corn belt region of the United States was an obstacle to further profitable market penetration in that richest and

most competitive of all farm machinery markets. It was decided that steps should be taken to identify the U.S. subsidiary --which is the largest MF subsidiary-- more closely with the corn belt region of the U.S. market.

Investigations indicated --from a market, social, cultural and educational viewpoint-- that Des Moines would be an appropriate location, particularly since it was centred in the heart of the U.S. corn belt market. When the opportunity arose to purchase a plant there, it was taken.

Interestingly enough, it was estimated that assembly input costs would be increased by the move, but it was also estimated that this would be more than offset by increased market penetration and strengthening of the company's retail system. The assessments further showed that if labor costs were assumed to be equal in the company's Canadian plants and at Des Moines, then there would be no significant after-tax cost disadvantage in transferring to Des Moines. Des Moines also offered certain freight advantages lacking in Canada. This subject is treated in chapter VII on distribution.

In succeeding months the Woodstock plant was closed, it being obsolete nearly to the point of physical collapse and unsuited for production of new and larger cornheads and tillage equipment, and some of the

equipment was moved to Des Moines. Subsequent operations at Des Moines have in fact revealed increased efficiencies including substantially improved work standards of approximately 40 percent in assembly and 50 percent in welding with an overall increase of output per manhour judged to be between 10 and 15 percent. Such an improvement, however, might have arisen entirely from improved facilities and manufacturing methods, a new employee work group and improved work standards, regardless of location.

North American Sourcing of Components and Machinery

The preceding discussion illustrates how the company's North American operations are now integrated. They are integrated, for instance, in that all combines for the North American market are assembled at Brantford, all tractors (except the lawn-and-garden or suburban type) are assembled at Detroit, and there is little duplication in North American plants in the manufacture of components.

Consider how this latter point works out in practice. A combine component, for instance, might be cast at "M" Foundry in Brantford, sent to the Toronto Works' machine shop for machining and then returned to Brantford for assembly into a combine. A casting for a tractor from the "M" Foundry in Brantford might be machined in the Toronto Works and then sent to the North American Tractor Plant in Detroit for assembly. The resulting tractor might be returned to Canada for marketing. Perhaps the longest journey would be an "M" Foundry implement casting, machined

in the Toronto Works and then sent to Des Moines for assembly. These transshipments obviously require careful long-range planning and inter-factory coordination, which in turn must be exceedingly flexible in order to overcome disruptions such as strikes and failure of suppliers to meet deadlines.

Today's plant locations are less than ideal in the sense that certain locations would not have been selected again if there were the opportunity to begin anew. The present locations, as already shown, were to some extent determined by happenstance and some selection occurred without benefit of Olypian foresight; also, these locations reflect the fact of historically lower labor costs in Canada as compared with the United States.

For example, one consequence of past location decisions is that almost the entire primary sourcing of all North American plants originates in Canada at the "M" Foundry and the Toronto Works, making Canadian operations more labor-intensive than those in the U.S. One-third of the company's cost of manufacturing in Canada is labor cost, whereas in the United States labor accounts for only one-tenth of the total manufacturing cost.

In addition, the assembly phase of the manufacturing sequence for combines and hay harvesting machinery --the second and third largest categories of MF farm equipment respectively-- is performed in

Canadian plants. It is the resultant mix of Canadian sourcing and Canadian assembly which largely accounts for the fact that, while total output of the company is split about even between Canada and the United States, about 80 percent of its hourly rated employees in North America have, in recent years, been located in Canada.

There should be no misunderstanding over the purpose of the company's policy of international sourcing of components and machines. It is a policy that enables the company to mimimize its costs both by locating production in the countries with the lowest costs and by switching production, particularly that of components, from one country to another.

Within the context of such a policy, that is, one in which component parts may be sourced from different countries, the actual location of a final assembly plant might have only limited economic significance. For example, the by-country origins of the costs, i.e., factory standard costs, of the MF135 diesel and MF1100 diesel tractors assembled at Detroit are:

MF135 and MF1100 Factory Cost Content by Country

	MF135 Diesel %	MF1100 Diesel %
United Kingdom	56.1	18.9
Canada	4.0	9.3
U.S.A.	39.9	71.8
	100.0	100.0

Obviously, in the case of the MF135 assembled in Detroit, the tractor manufacturing activity in total is "located" more in the U.K. than in the U.S.A. The opposite holds true in the case of the MF1100. In the case of the MF410 and the MF510 gasoline combine models assembled at Brantford, the summary of material costs by country of origin is:

Material Costs of Certain MF Combines by Country

	MF410 (Gasoline) %	MF510 (Gasoline) %	All Combines %
Canada	81.3	80.2	73.0
U.S.A.	17.3	18.4	22.9
Germany	1.4	1.4	1.4
U.K.	.0	.0	2.7
	100.0	100.0	100.0

The heavy reliance on Canada, not only as a source of finished combines but as a source of combine component parts, is clearly shown. Important relative cost changes could, of course, change the country of origin of the components without changing the assembly site.

Conclusions Relating to Plant Location

First, the tendency of the company to locate more of the labor-intensive manufacturing operations in Canada rather than in the United States is almost certainly the result of a history of relatively lower Canadian labor costs. In the case of the combine plant, such lower costs were decisive in the argument that the company's North American assembly operation should be located in Canada.

Second, the acquisition of some North American manufacturing and assembly operations, and so the determination of their location, has been heavily influenced by the need and the desire to acquire products and technology quickly, i.e., the 1927 Case Company, the 1948 Fowler acquisition, the 1953 merger with Ferguson, the 1957 acquisition of the transmission and axle plant, the purchase of Midwestern Industries in 1957 (industrial and construction machinery), and Badger Northland (farmstead materials) in 1964.

Third, the apparent relationship between market penetration and plant location has influenced some decisions, e.g., the 1947 decision of Ferguson to build an assembly plant in the U.S. instead of importing

tractors, and the 1965 decision to begin an implement assembly operation at Des Moines.

Fourth, if the cost advantage was removed then the force of the last point --market identification and penetration-- when making plant location decisions, would be greatly increased.

RELATIVE COSTS OF COMBINE PRODUCTION WINNIPEG vs. BRANTFORD

The Commission has asked: "Have you ever considered establishing a farm machinery plant in western Canada? What would be the advantages and disadvantages of such a location?"

While MF has views on the matter, it had not thought it necessary to undertake a formal location study so as to translate its views into quantitive form. However, in order to answer the Commission's question in an authoritive and objective manner it was decided to retain a firm of consulting economists to investigate the matter. MF has their report and will outline here its major conclusions.

The approach the firm was asked to take was to estimate the costs of transferring to and operating in western Canada an existing Ontario plant and to compare that cost with those of the plant in its Ontario location. The combine plant at Brantford was selected, since the

Canadian market for combines is centred in the prairie provinces and the dominant market for combines in the United States is in and to the immediate east of the northern great plains area. That plant is also most suitable for relocation analysis, being an assembly operation producing a single product.

Winnipeg was chosen as the western location to be considered since it is the most ideal location with respect to the distribution of combines to the Canadian prairies. It is also the city which is closest to the centre of the U.S. combine market and closest to supplies of material coming from central Canada and the north central United States.

The period chosen for analysis was the year ended October 31, 1965. Attention was focused on cost differences alone, for it was assumed that sales would not in any way be affected by that move.

The final results of cost differences are summarized in the table below:

Difference between estimated costs at Winnipeg
and actual costs at Brantford
of operating the combine plant
(Nov. 1, 1964 - Oct. 31, 1965)

	$ Millions Assuming 1965 Winnipeg Costs	$ Millions Assuming Wage Equality between Winnipeg and Brantford
Direct Operating Costs:		
Materials	±0	±0
Labor - hourly and salaried	- .4	±0
Inbound freight	+1.6	+1.6
Sub-total	+1.2	+1.6
Outbound Transportation Costs:		
Wholegoods	- .4	- .4
Parts	- .1	- .1
Sub-total	- .5	- .5
Occupancy Costs:		
Relocation	+ .3	+ .3
Depreciation	+ .1	+ .1
Sub-total	+ .4	+ .4
Total Cost Difference	+1.1	+1.5

The table shows that it would have cost $1.1 million more to operate the plant in Winnipeg during the year in question than in Brantford, and $1.5 million more if it is assumed that the same wages prevailed there as at Brantford. The increase in costs of $1.5 million would have significantly reduced MF profits in 1965.

The table also shows that the main reason for the increased costs at Winnipeg is the sharp increase in freight costs of inbound production materials and supplies. It is estimated that these would rise by $1.6 million, or well over 300 percent. This may be viewed as the basic disadvantage of relocating in western Canada. The basic advantage would be the $ .5 million decline in outbound transportation costs.

ECONOMICS OF TRACTOR PRODUCTION

The preceding section of this chapter has outlined the circumstances surrounding the company's tractor plant location decisions.

It was noted that the decision to acquire the Racine, Wisconsin tractor plant in 1927 was heavily influenced by the need for the Massey-Harris Company to acquire a tractor and tractor engineering and manufacturing technology and facilities quickly.

The decision of Ferguson in 1947 to build an assembly plant was influenced by the view that U.S. farmers would be reluctant to buy an imported tractor; Detroit was a desirable location because of the nearness to suppliers, particularly since Ford had up to that time been manufacturing the tractor at Detroit. The Detroit decision was also, of course, influenced by the local availibility of technical skills and facilities.

Since then, MF has continued to expand the Detroit facilities finding that location to be continually attractive. The policy of international sourcing of components has increased the attractiveness of a U.S. tractor plant location relative to a U.K. location from what it used to be.

Size of Market

The next point to be made is that in the view of the company the size of the North American market does not yet economically justify its having two tractor assembly plants. In 1966 Massey-Ferguson's Coventry plant produced 78 ,553 tractors, and that plant, ignoring transportation costs, is the company's most efficient tractor plant. The Detroit plant in that year produced 39,184 tractors, and in MF's opinion that output can be expanded without deterioration in unit cost of production. Finally, the company sells approximately 7,000 to 8,000 tractors a year in Canada which, in the MF view, would be too small an output for an economically efficient plant producing a number of tractor models.

Royal Commission Queries

The Commission has asked if MF "thinks a tractor production facility could be located economically in Canada?" To clarify this question the company points out that if the question refers to whether it could now locate a tractor plant to its economic advantage in Canada, the answer would have to be, No, for the reasons given in preceding paragraphs.

In further clarification, if the question asks if all the tractor

component manufacture as well as the final assembly operation could, in the foreseeable future, be located in Canada, the answer would also have to be, No, because of the competitiveness of major tractor components imported from Europe.

Finally, if the question asks whether or not the company's present U.S. tractor manufacturing and assembly operations could operate economically in Canada --assuming that the company did not already have such a facility in the U.S.-- then the answer is more difficult. However, for the benefit of the Commission, in order to answer its question in a specific way, a firm of economic consultants was hired to undertake a comprehensive study of the matter.

The approach taken was to estimate the cost of relocating and operating the company's Detroit tractor plant and transmission and axle plant (since the two logically go together) in southern Ontario compared with the costs of operating them in the U.S.

Since these plants also manufacture equipment for industrial application and since the company's industrial and construction machinery operation would remain in the United States, the move would involve a net increase in tariff costs. The specific site chosen in Ontario was Brantford, not Toronto, because of land availability and certain lower costs such as utilities, services and taxes , better accessibility and the presence of the 'M' Foundry at Brantford. The time period chosen was the 12 months beginning November 1st, 1964.

The cost differences between actual Detroit location and the hypothetical Brantford location, assuming both existing wage differences and Brantford wage parity with Detroit wages, are summarized in the table below:

Differences between estimated cost at Brantford
and actual cost at Detroit of operating
the tractor and transmission and axle plants
(Nov. 1, 1964 - Oct. 31, 1965)

	$ Millions Assuming 1965 Brantford Costs*	$ Millions Assuming Wage Equality between Brantford and Detroit*
Direct Operating Costs:		
Materials	- .9	- .9
Labor - Hourly and salaried	-1.8	-1.0
Utilities	- .1	- .1
Sub-total	-2.8	-2.0
Duty on Goods Produced	+ .4	+ .4
Transportation Costs:		
Inbound Materials	+1.7	+1.7
Outbound Finished Product	+ .6	+ .6
Sub-total	+2.3	+2.3
Occupancy Costs:		
Relocation	+ .7	+ .7
Depreciation	+ .4	+ .4
Sub-total	+1.1	+1.1
Total Cost Difference	+ .9	+1.7

* Based on Canadian dollar figures. This means that all U.S. costs were raised by the amount of the exchange rate difference, the rate of $1.079 Canadian dollars to $1 U.S. being used. As a result, of course, using the company's definition of wage rate equality, a situation in which wage rate equality existed would be one in which labor costs in the U.S. in terms of Canadian dollars would be higher than labor costs in Canada in Canadian dollars.

In general, the table shows that direct operating costs would have been $2.8 million less in Brantford than Detroit but transportation costs $2.3 million more, and occupancy costs $1.1 million more. Duty on goods would rise by $ .4 million. In total, then, during the year in question, it would have cost $ .9 million more to operate the plants at Brantford than at Detroit, under present wage relationships. Had parity prevailed at the time, it would have cost $1.7 million more.

It should, perhaps, be noted that the high freight costs arise from the fact that a wide range of heavy components are not available in Canada and would have to be shipped from the United States.

It is rather interesting to note that if tariffs on industrial and construction machinery were eliminated and the existing Canada - U.S. wage differential maintained, and if cost of moving existing operations were excluded(to take into account the position of a company starting without existing facilities) then Canadian and U.S. costs would be quite similar.

TARIFFS AND FREE TRADE

The Commission has asked MF what effect the removal of U.S. tariffs on agricultural machinery in 1913 and Canadian tariffs in 1944 had on company production operations in Canada; and if the removal of the tariff on light industrial equipment would significantly change the relative advantage of a Canadian location for tractor production.

Farm Machinery

With respect to the first question, several general points may first be made. In 1913, Massey-Harris had only recently acquired a controlling interest in the Johnston Harvester Company of Batavia, which was manufacturing Johnston machinery, mainly for the export market. It is unlikely, although no specifically relevant information exists on the point, that the Johnston operation was affected in the short-run by the 1913 removal of the U.S. tariff. Massey-Harris executives had been very concerned over the reciprocity debate, apparently because they feared the U.S. competition that it would encourage. The company, of course, did not, at that time, enjoy any significant share of the U.S. market.

Nor is there evidence of any immediate and visible impact on the company's location decisions of the 1944 removal of the Canadian tariff.

It is MF's feeling that the impact of free trade is a long-term one, and this essentially because plant location decisions are long-term decisions.

Free trade, in MF's view, has permitted the company to increase its economic efficiency in three important respects:

- it has permitted MF to concentrate all its North American combine assembly activity in one plant, at Brantford, and has permitted the company to locate the plant at a site which, at the time, appeared to be the lowest cost location; and it has enabled MF to do the same thing for tractors at Detroit;

- it has, on the whole, influenced and enabled the company, gradually over time, to locate its more labor-intensive operations in Canada and its less labor-intensive operations in the U.S. as far as North American operations are concerned;

- it has permitted the company to develop its system of international sourcing of component parts and by so doing to realize further economies and compete more effectively in the U.S. market.

Also, for these reasons, MF believes that free trade has led to lower farm machinery prices in Canada.

In the light of these free trade influences, the Commission may be

interested in the way in which the company's employees in North America have been distributed between Canada and the United States over the period when the aforementioned integration of its North American operations was taking place. In 1939, of its total North American employees, 59 percent were in Canada (Massey-Harris only); in 1954 (Massey-Harris-Ferguson)the figure was 60 percent; in 1966 it was 61 percent. Also, in recent years, about 80 percent of MF's North American hourly rated employees have been located in Canada.

Industrial and Construction Machinery

The Commission has asked whether the removal of the tariff on light industrial equipment would significantly change the relative advantage of a Canadian location for tractor production. This question can, perhaps, best be answered by considering it in a somewhat broadened context; in order to do so, consultants were retained to make certain comprehensive cost estimates.

They have estimated what the cost of manufacturing would be for the MF industrial and construction machinery (ICM) plant until recently located in Detroit had it been located instead in Canada. The output of that plant included industrial tractors. The results suggest, assuming continuation of the present Canada - U.S. wage differential and the existing tariff structure, that the costs of that operation would rise 14 percent.

An analysis of the cost categories suggest that almost all of the increase in costs is explained by the duty that would have to be paid on industrial and construction machinery manufactured for sale in the U.S. market. The increase in freight costs would be more than offset by the reduction in labor and material costs. Massey-Ferguson concludes that the U.S. tariff makes it prohibitive to locate such a factory in Canada as long as it is assumed that a significant part of the output of the factory would be sold in the U.S. market.

If continuation of the present Canada - U.S. wage structure but with complete removal of the tariff is assumed, then it would appear as if the costs of the ICM operation would be about one to two percent more in Canada than in the United States.

It is Massey-Ferguson's impression that in the case of a company with only one North American ICM assembly plant --and that one depending fairly heavily on the large U.S. market-- that plant would be better located in the United States than in Canada, even with free trade because of market identification and transportation advantages. At the same time, with free trade that company might begin sourcing more of its component parts in Canada, and might build a second plant in Canada, provided the company enjoyed a sufficient share of the Canadian market, and Canadian labor costs maintained their present relationship to those in the U.S.

It is Massey-Ferguson's impression that free trade in industrial and construction equipment would not significantly change the relative advantage of a Canadian location for tractor production. Prior to arriving at this conclusion MF's consulting economists estimated what the cost of manufacturing in the Detroit tractor plant would be if located in Canada rather than in Detroit, assuming present Canada-U.S. wage differentials.

The estimate suggested that total costs would be marginally higher in Canada, assuming existing tariffs, and that removal of the tariff would not have a significant effect on the costs of the plant in Canada. The latter is principally because many of the major tractor components would be sourced in the United Kingdom and the United States and so even under existing tariff arrangements, the company would see its duty reduced through drawbacks on exported non-agricultural machinery. But again, it should be emphasized that with free trade, and if present Canada - U.S. wage differentials remain, then it is possible that in time more of the manufacture of components would be shifted to Canada.

CANADIAN-U.S. WAGE PARITY

The Commission has also asked the following question: "How and to what extent is the drive for wage equality between Canada and the United States likely to affect the competitive position of Canadian production?"

Massey-Ferguson regards this as a most important question and has had completed a comprehensive study in order to provide as valid an answer as possible. Since wage parity may be thought of in terms of the economy generally, and also in terms of parity in particular industries, both shall be considered, beginning with the former.

Wage Parity throughout the Economy

When the term "wage parity" is used it shall refer to a situation, unless indicated otherwise, where Canadian unit labor costs, i.e.,wage plus fringe benefits, in Canadian dollars are numerically equal to unit labor costs in the United States in U.S. dollars for the same jobs in the same industry, i.e., assuming no adjustment to equalize the values of the two dollars.

If there were an upward movement of wage rates in Canada in excess of productivity increases, i.e., real output per manhour or real output per employed person, this would raise costs, reduce profit margins and induce business to increase prices in order to restore profit margins.

The relative stability, in a trend and not a cyclical sense, in the proportion of Canadian gross national product represented by wages, salaries and supplementary labor income on the one hand, and corporation profits before taxes on the other hand, provides some evidence that economic forces will indeed operate in that way.

Now, if the resulting increase in the general price level in Canada exceeded that of other countries, particularly that of the U.S., imports would tend to rise, exports to fall, and possibly a destabilizing outflow of capital would also develop. These flows would cause downward pressure on the foreign exchange value of the Canadian dollar, a loss of exchange reserves as the official authorities attempted to maintain the fixed rate, and, finally, a devaluattion of the Canadian dollar.

What then would be the consequences of these developments for the competitiveness of the company's manufacturing operations in Canada? After it was all over, the deterioration in the company's costs would presumably be offset by the increase in its export selling prices arising from the devaluation of the Canadian dollar, leaving the position of the company unchanged.

In this process wage parity in any real income sense would not have been achieved; and would be no closer than before. While a Canadian worker would be getting the same Canadian dollars per hour as the U.S. worker, the higher price level in Canada would, in terms of purchasing power, have further reduced the value of the Canadian dollar below the U.S. dollar, thereby leaving the same real income-spread between Canadian and U.S. wages as existed before.

The harm to Canadian production would arise from the uncertainty generated during the period of transition from one exchange rate to another. If, in that period, a company saw its costs in Canada deteriorating rapidly in relation to costs in the U.S., and if it felt it could not be certain that the Canadian dollar would eventually be devalued to make up for that deterioration, then it might be influenced to locate new plants in the United States. There is, of course, no certainty of the total economic consequences of this cycle of excessive cost increases, price increases and currency devaluation.

Feasibility of Partial Wage Parity

Much discussion concerning wage parity relates to partial parity, that is, parity in specific industries, particularly the steel and automobile industries. Since the dominant union in the automobile industry is the same as in the agricultural machinery industry, the possibility of extension of American wage parity demands to the agricultural machinery industry in Canada is raised.

Consider first the question: "Is partial wage parity a viable concept?" It is, of course, a viable concept in the sense of those cases where an industry in Canada has different working conditions, i.e., greater isolation, colder climate, than its counterpart industry in the U.S. But this is not the case in the industries mentioned above.

The question then really is: "Can one reasonably expect that if the workers in the steel and automotive industries succeed in significantly changing their wage position within the Canadian wage structure, that other workers would sit idly by and not try to catch up with them in order to preserve their share of the national income?"

There is at least a strong possibility --human nature being what it is-- that they would not sit idly by; they, too, would militate for parity. And so higher wage rates would soon be established in all Canadian labor markets.

If these circumstances eventuated, then a move toward wage parity in the steel, automobile and agricultural machinery industries prior to achievement of parity of productivity throughout the economy, would initiate a general movement toward wage parity. In the wake of such a movement would come higher costs, higher prices and dollar devaluation.

"Selective" Wage Parity

One aspect of this partial wage parity issue might be specifically considered. It is sometimes argued that wage parity should come in industries where "productivity" in Canada is as high as it is in the United States. In the form in which the argument is frequently stated, which usually is based on some concept of physical productivity, that is, physical output per man or per hour, MF regards it as misleading and perhaps even fallacious. Assume an industry in Canada that suddenly

experiences annual productivity increases greater than the same industry in the United States and greater than increases in productivity in the economy generally in Canada. Assume also that this superior performance continues until the Canadian industry's average physical output per factor input ("factor input" since all inputs --management, capital, labor-- contribute to increasing productivity) is equal to that in the United States, but that such superior performance is not the case with industry generally in Canada. In such circumstances, what should be the reaction of the Canadian industry in question? Few would question that it should certainly pay a fully competitive rate of return on its capital and fully competitive rates for labor as indicated by Canadian wage levels. But is it logical for it to pay U.S. wage rates in Canada? MF believes not. After paying a competitive rate for capital and labor it should use any margin left to lower its prices, (or, more likely, slow down their rate of increase in the face of rising costs) so as to improve its competitive position in export markets (or to stiffen its price competition against imports). This should enable it to increase its output and so increase its employment of Canadian labor. By this action, it would encourage the movement of workers in Canada from low productivity and so low wage jobs, to high productivity and high wage jobs.

Now, if a company were required to pay out in wages all revenue earned from increased productivity, so as to raise its Canadian wages to U.S. levels, even though wages in general in Canada were not up to their

U.S. equivalents, then it would have no leeway for using price policy to increase its share of export markets, and thus no opportunity for increasing its output and employment.

In effect, therefore, a policy of wage parity for those Canadian industries with physical productivity equal to that in the U.S. is a policy that would inhibit the movement of workers in Canada from relatively low productivity, low wage jobs to high productivity, high wage jobs. It is difficult to see how workers in general and the economy in general would be better off as a result of such a policy.

The conclusion seems evident that a policy of partial wage parity, in the sense in which the phrase is often used, may lead to general wage parity and dollar devaluation; and that to the extent that it does not lead to general wage parity it may benefit the rich workers at the expense of the poor, discouraging the growth and export activity of high-productivity Canadian industries.

Partial Wage Parity in the Agricultural Machinery Industry

Consider now what effect a move toward wage parity in the Canadian agricultural machinery industry would have upon Massey-Ferguson. In order to obtain comprehensive and objective answers, the company retained an economic consulting firm to undertake a study of the matter.

Increased Costs

The approach the consulting firm took was to estimate what the cost of parity would be and then to estimate what this would mean for the company's total Canadian production costs. Its analysis showed that for the year 1965 a move to basic wage parity would have brought an average increase of 50.5-cents-per-hour for each Canadian Massey-Ferguson worker. Wage parity would have resulted in a total increased labor cost of approximately $5.7 million. This amount would have substantially reducted the company's rate of return on its $153 million in Canadian assets.

Competitive Disadvantage

The next important result of the consulting economists' analysis was to show that the impact on Massey-Ferguson of a move toward wage parity would almost certainly be significantly greater on MF than on its major competitors. The reason for this is that Massey-Ferguson has concentrated a larger proportion of its total North American production in Canada than its competitors and because MF's operations in Canada are of the more labor-intensive kind compared with its operations in the United States.

The company produces half of its North American output in Canada and has approximately 80 percent of its hourly rated employees in Canada. This makes it unique among the major full-line agricultural machinery companies in North America and makes it more vulnerable than its compet-

itors to increased Canadian labor costs relative to those in the United States.

What then would wage parity mean for Massey-Ferguson's manufacturing and assembly activity in Canada assuming there is no offsetting devaluation of the Canadian dollar? When the location study for the Brantford combine plant was completed for the company by outside consultants in July 1960, it showed that the Canadian location was justified entirely on grounds of lower labor costs. What would have been the result if the study had assumed labor costs in the Toronto area to have been the same as in the various U.S. locations? The answer is indicated by the following figures:

Comparative Operating Costs at Certain Possible Combine Plant Sites (1960)

	Total Costs in Excess of Toronto Area Location (1)	Labor Costs in Excess of Toronto (2)	Difference (1 minus 2)
Denver	1,933,100	1,074,600	858,500
Wichita	791,600	607,400	184,200
Des Moines	1,036,500	1,214,700	-178,200
Memphis	1,030,000	981,100	48,900
Minneapolis	1,263,400	1,238,100	25,300
Chicago	1,080,800	1,588,500	-507,700
Cincinnati	1,273,300	1,308,100	- 34,800

The first column shows that the total Toronto area costs were lower than those of all the U.S. locations considered. If from the total cost advantage of the Toronto area the advantage explained by lower labor costs is subtracted, as done in column three, it is apparent that total costs at Des Moines, Iowa; Chicago, Illinois; and Cincinnati, Ohio would have been lower than those of the Toronto area and that those at Memphis and Minneapolis would have been only marginally higher.

Under wage parity circumstances the temptation to place the combine plant nearer to the larger market, in the hope of increasing market penetration by such action, would probably have been great. The company, of course, was not required to face that decision in 1960 since wage parity was not then at issue.

Brantford and Detroit

Recently the company has had the cost estimated for operating the North American Tractor Plant at Brantford, assuming first existing Brantford wages, and then Detroit wages. The results show that assuming continuation of the then-current wage patterns, the costs of operating those plants at Brantford would be almost the same as at Detroit, but assuming Detroit wages at Brantford the costs would be higher at the latter location than at Detroit.

* * *

While MF is entirely conscious of the statistical problems involved in making accurate estimates of relative costs, it has, with the information available, come to these conclusions:

- a move to wage parity without an offsetting devaluation of the Canadian dollar would affect Massey-Ferguson more than its major North American competitors, placing especially great pressure on MF to minimize the cost consequences of such a development. Competition would not permit the company to offset such cost increases simply by raising prices;

- wage parity could influence present plant locations and would influence future plant locations;

- the high cost of closing and relocating existing facilities might well postpone such action, but this would depend on the price the company could obtain for its existing properties. However, some shifts in the sourcing of components and a restructuring of facilities to substitute capital for labor could occur before actually changing the location of any existing factory buildings;

- even now, relative costs are such that the penalty of locating in the U.S. some plants engaged solely in assembly operations is sufficiently low for such costs

to be outweighed in some cases by assumptions concerning increased market penetration, more supporting industries and increased labor efficiency; in that event, however, the question of location of primary plants would also have to come under review;

- with existing Canada - U.S. relative wages, it would seem feasible for the company to continue its past tendency to locate its more labor-intensive North American manufacturing activities in Canada. With wage parity --and no further devaluation of the Canadian dollar-- such a policy would no longer be economically attractive.

Chapter V

MARKETING

Massey-Ferguson's marketing practices in North America are predicated on two major factors which complement each other. The first is the natural geographic unity of the North American marketing area.

The second is the high degree of similarity between the sociological and economic attributes which characterize the Canadian and U.S. farming communities. While there are differences, the internal differences with respect to either of the two countries perhaps are as pronounced as is the total difference between the two countries.

Massey-Ferguson's approach to marketing in North America reflects the substance of the above mentioned factors or beliefs; namely, that North America constitutes a natural single farm machinery marketing area. Indeed, MF's total North American marketing structure reflects these factors.

For purposes of administrative control and in order to provide dealers and their customers with the best possible total service, the company has established geographical marketing sub-divisions. These sub-divisions, as described later in this chapter, conform, as one would expect, to major regional differences in agricultural practices.

The company's marketing activities in North America are headed by a director marketing. He, working through his head office and field forces in Canada and the United States, is accountable for the achievement of the company's marketing goals in both countries. To achieve these goals, the marketing department is divided into three areas of responsibility; planning, retail development and the sales force. In addition, there are marketing-type responsibilities known as field services.

This chapter shall treat in some detail the functions and responsibilities of each of these functional areas. It shall also discuss some of their interactions with other elements of the total North American organization. This interaction-coordination aspect of marketing activity is of particular significance; for MF believes that all the marketing skills the company possesses will not build a volume for machinery that does not meet clearly identified needs and meet them better than, or at least as well as, competitive machinery. Therefore, the marketing department is structured to work with the engineering and manufacturing departments to help ensure that MF machinery meets customers' design and performance needs.

PLANNING

This marketing function, headed by an assistant marketing director, develops and maintains long-term product line strategies and short-term

supporting product and parts marketing strategies. Hopefully, these will enable the company to satisfy customer needs at a profit and to enhance its competitive and financial position. To do so, market-planning must:

- create product line strategies based on consumer needs;
- develop studies to establish priorities and broad technical specifications for new product developments;
- establish plans based on marketing targets, volume forecasts and competitor activity;
- assist field sales organizations in translation of marketing plans into sales implementation plans;
- audit actual performance against marketing plans;
- provide market and economic research, advertising and sales promotion support for all marketing functions.

Market Planning and Product Planning

The marketing-planning staff includes five market planners --known as marketing planning managers-- who specialize respectively in tractors, grain harvesting machinery, hay and forage machinery, general machines, e.g., planters and cultivators, and special products, e.g., lawn and garden tractors. These market planners are supported by product planners who specialize, respectively, in the same types of machinery named above.

The market planner-product planner combination is the final step in the sequence of coordinated marketing-engineering-manufacturing activities that MF has brought to maturity in recent years. In engineering, all research and design is done on a product basis with specialists working in different product areas. In manufacturing, each assembly plant is specialized for a particular product, e.g., tractors at the North American Tractor Plant in Detroit; combines at the North American Combine Plant in Brantford. And in marketing, all product definition and market planning are done on a product line basis.

The product planner, as opposed to market planner who is a strategy planner and coordinator, is basically a technical expert in his and his market planner's category of machinery. He is the company's authority on its actual and potential North American agricultural uses.

The product planner and the supporting marketing-planning services of advertising, sales promotion and market and economic research help enable the market planner to accomplish his job: in brief, providing his category of machines, at a competitive price, to customers when they need them. This requires close working relationships with and the cooperation of the engineering, manufacturing and planning and procurement departments.

To accomplish this task, each market planner must create the overall sales plans and product strategies that will sell his product in the

market place. Once his total sales program is agreed to by the field sales force, the sales force is committed to its successful conclusion. The market planner, however, remains committed to the premise that his program will indeed produce the sales and profit results he has predicted. For his plans to be accurate, they must incorporate and reconcile all problems of engineering, manufacturing, inventory level, distribution, costs, competition, etc. The market plannner deals primarily with information which he must often first procure and of which he must always judge the validity.

With this information he must then influence the opinion of others regarding his group of machinery and the most efficient and profitable manner to design it, make it and sell it --so as to bring it to customers when they need it.

The MF market planner is thus a product marketing specialist who gathers and furnishes information on all aspects of his assigned group of machinery; generates ideas for and advises top management on initial product development, product improvement and product promotion; and performs liaison with advertising and merchandising agencies in the actual development of sales programs.

Freedom of communication is obviously essential to the market planner. He has direct contact with product specialists in engineering, manufacturing and staff service functions throughout the company. He often

goes directly to the field to shorten reaction time from customer-to-factory-to-customer. His activities are of crucial importance in enabling the company to develop, design, manufacture, distribute and sell products in North America which meet consumers' expectations.

Advertising and Sales Promotion

The marketing-planning function also includes advertising, sales promotion and market and economic research specialists. They are so located within the total marketing organization to facilitate the most direct contact and rendering of services to the market and product planners. These specialists, however, provide their services to other marketing organizational elements requiring them including the field sales organization.

The advertising specialists work, in general, with an advertising agency, to develop creative media plans. These plans are conceived and executed in support of overall marketing strategy as are sales promotion activities.

Marketing and Economic Research

The marketing and economic research (MER) group under marketing-planning consists of professional economists. In general, they study and analyze the following factors in relationship to the agricultural economy of North America: geography, weather, farm prices, farm production volumes, numbers of farms, population of various machines on farms, rural elect-

rification, cost and availability of fuels, size of farms, work force on farms, farm production costs, federal and provincial farm programs, effects of taxation, farm subsidies, availability of finance to agriculture, age of farm machinery populations and many others.

Based on these studies, MER produces information in several areas of fundamental concern to the company: the past, present and probable future of the agricultural economy and consumer reaction to MF's and competitors' products as revealed in purchasing behavior.

Over the years MER has accumulated an information bank with which new information can be combined to forecast demand for MF machinery through probability techniques. The marketing department plans for about four years in broad terms and for 18 months in detail. MER contributes heavily to both phases of this work. One example is studies leading to forecasts of the potential market for each MF machine prior to the start of each new year. These studies are undertaken in support of the market planners and will influence the number of any given machine produced by the company the following year. The manufacturing costs, and consequently the consumer price, are related, of course, to the number produced --as influenced by the MER forecasts. The comptroller department also contributes manufacturing and marketing financial analysis to these forecasts.

With regard to longer run investigations, MER is continuing its study of a significant trend in agriculture; the decline in the number of farms. The farm machine population is decreasing. At the same time, however, farm production is increasing, and so is the total dollar value of machines sold. From its studies of such trends MER attempts to forecast machinery characteristics required to meet future customer demand in terms of power, dimensions, weight, etc. These studies not only project the machine characteristics that changing agricultural economics will require but also help pinpoint when and how many of each size within a machine category might be sold.

The above marketing and economic research capabilities notwithstanding, a considerable gap still exists between statistics and forecasts presently available to the farm machinery industry --upon which it must base long-range commitments for production runs-- and those types of statistics and forecasts which enable other capital consumer good manufacturers to accurately gauge their markets.

Weather, and other natural phenomena, of course, compound the difficulty of manufacturing and market planning, a problem not faced in such intensity by other manufacturers.

Until more data and more reliable forecasting techniques are available, MF will continue to be faced with the financial consequences of having

to commit major resources to production logistics sometimes 18 months before the resulting farm machinery enters the market.

The company, of course, is pursuing means of reducing the required manufacturing lead time and of enhancing its reaction time to unforeseen alterations in manufacturing requirements. MF believes, however, that the eventual elimination of burdensome inventories and their concomitant financial penalties will require improved information acquisition, a logical prerequisite for better information utilization.

MER also has other responsibilities. From time to time, for instance, it initiates consumer research studies on behalf of the advertising group or other company departments. Some of these studies are undertaken by agricultural colleges and underwritten by the company. The company has based product change and some of its advertising campaigns on such studies.

A final marketing-planning responsibility is parts merchandising. The activities of this function are explained in chapter VIII on parts.

RETAIL DEVELOPMENT

A second major element of the marketing department is retail development, a function also headed by an assistant director. This staff consists of experts in dealer recruitment and development and retail

store management. The purpose of retail development is to develop optimum retail coverage of the total North American agricultural market through independent dealers, company stores or other appropriate methods. To do so, the assistant director retail development must:

- create plans for the recruitment, development and assistance of dealers;

- establish dealer operating standards that adequately and realistically relate capital and personnel requirements to an area's market potential;

- establish systems and standards of business management for dealerships and provide training programs and analytical services;

- develop creative sales service methods which relate customers' needs to MF products and services.

Retail development provides imaginative retail activities to the dealer organization. These activities are intended to improve both dealers' capabilities and success as businessmen. In part, retail development achieves its objectives through the provision of business management training programs that stimulate existing dealerships and help attract new dealerships in high potential markets.

Some of this stimulation derives from dealer exposure to the MF concept of total customer service with emphasis on product applications consultation, systems selling and technical advice to the farmer. Retail development also offers the dealer a financial statement analysis service which highlights strengths and weaknesses of present dealer practices.

Through the marketing-retail development section, franchises are expanded, kept up-to-date and competitive. This requires territory analysis and preparation of dealer recruiting aids.

Retail development concerns itself with nearly every aspect of farm machinery retailing: accounting, advertising, banking, building, design and location, displays, finance, operating expenses, personnel requirements, record keeping, recruiting, sales promotion, service, selection of sites and signs plus selling of accessories, machines and parts.

Retail development also supervises the operation of about 40 MF-owned retail stores all located in high potential areas in the U.S. where no qualified retailer is currently available to handle MF products. These stores are all presently located in the U.S. The company policy is to establish MF business through these stores and then sell them as MF dealerships to qualified independent businessmen. In the interim, they are sometimes used to train MF's own sales field force.

Besides helping increase MF's retail coverage, these stores serve as laboratories. In them, new techniques of marketing and retail management are tested without risk to the independent dealers who ultimately benefit from their application or, possibly, their avoidance.

MF believes that a successful, well-managed dealership serves the farmer better and, conversely, that the better a dealer serves a farmer, the more successful the dealer --and the farmer-- become.

FIELD SERVICES

A third major marketing-type area of responsibility is called field services. These responsibilities include service training, product training, plans and control, development and implementation of field forces administrative procedures, service management for all segments of the agricultural line and control of wholegoods allocation and distribution.

To attain these objectives, field services must:

- create programs of service and sales instruction on company products;

- coordinate product service activity including the preparation of product and product service literature; the provision of technical advice to the field; and analyses of product problems and of new product serviceability;

- ensure product availability to meet sales requirements through distribution plans, practices and procedures which integrate sales forecasting with wholegoods production and allocation;

- create administrative practices, procedures, instructions reporting and information systems for the entire marketing department.

To achieve these objectives, the company employs experts in product service, product training, wholegoods distribution and administrative plans and controls.

Service training and product training facilities are located at the MF Training Centre at Indianapolis, Indiana. A staff of technical writers also located at the Training Centre prepares machine maintenance and operator's manuals.

The plans and control staff performs liaison with the comptroller on control reports and on financial matters and works with the management services department to ensure marketing's effective use of management science techniques. The plans and controls personnel are also responsible for marketing department conformance to established plans and procedures.

FIELD OPERATIONS

As the name implies, this is the marketing department function which comes most directly in contact with MF dealerships and their farmer customers. The field force is geographically dispersed for coverage of the entire North American market. For marketing purposes, MF has established five marketing divisions in Canada and the U.S.

Marketing Sales Division

One division encompasses all of Canada and is known as the Canadian sales division. The other four are in the United States and are known as the eastern, north central, central and western sales divisions. The headquarters of these five divisions are located, respectively in:

City	Division
Toronto, Ontario	Canadian
Atlanta, Georgia	Eastern
Chicago, Illinois	North Central
Kansas City, Kansas	Central
Denver, Colorado	Western

These sales divisions are based on market characteristics rather than geographical considerations. Primary factors in their establishment are the types of farms and the kinds of crops grown, the type of farm machinery used and the climatic and seasonal variations.

Each of the five sales divisions is headed by a divisional general sales manager who reports to the director marketing. The divisional general sales manager possesses a high degree of autonomy. He is the source for on-the-spot decisions, sales administration decisions and personnel direction within his division.

MF believes that a decentralized force provides advantages in speeding reaction to problems and opportunities in the field. To make such a decentralized sales force concept work, each divisional general sales manager must:

- keep head office staff groups informed of all significant consumer trends, crop and weather conditions and competitive activity;

- offer ideas to the market planners based upon conditions and trends he observes in his division;

- develop and implement yearly plans, assign the plans' objectives to his divisional sales force and achieve its sales volume, penetration and profit goals;

- revise programs and request specialized head office staff support, when necessary, to achieve sales and profit goals;

- help dealers develop and maintain profitable dealerships through dealer consultation, merchandising and other services.

- ensure maintenance of high standards of consumer service;

- ensure that company and dealer personnel continue receiving product training and new product information.

Divisional Staff

To assist each divisional general sales manager, the company provides him with a staff of three managers:

- the field planning and control manager who administers the expense plans for the division and develops plans to achieve the divisional market and profit objectives. He coordinates extensively with plans and control personnel in marketing-field services at the head office and also with comptroller personnel;

- the merchandising manager who assists in the divisional implementation of national programs and promotions, local programming, product training and demonstrations and new dealer openings. He coordinates extensively with head office counterparts in both marketing-planning and marketing-retail development;

- the dealer development manager who implements for his sales division the strategies developed in conjunction with marketing-retail development and who inspects the performance of the branches in this area.

Branch Offices

A division has three to five branches located throughout its territory. A teletype and WATS communication system provides instantaneous communication among branches, division headquarters and with most company facilities in North America.

Within Canada are five branches located at Montreal, Toronto, Winnipeg, Saskatoon and Calgary. Saskatoon is typical and is manned by 90 persons including secretaries and warehousemen. There are sub-branches and warehouses at Moncton, London, Regina and Edmonton. (A warehousing operation is located at Yorkton, primarily for the distribution of wholegoods.)

Branches are managed by a branch manager who reports to the general sales manager in Toronto. The activities in the branch are divided among five sections:

- Sales: at Saskatoon, for example, this section employs 24 persons of whom 19 are district managers. These men, known as "DMs", call regularly on 8 to 12 dealers and investigate locations where MF wishes to establish dealers;

- Technical Services: at Saskatoon this section employs 10 persons who spend most of their time in the field instructing dealers and, to some degree, farmers in the field assembly of MF machines, their adjustment, operation, maintenance and repair;

- Parts: this section employs 20 persons at Saskatoon who receive, warehouse and distribute repair parts throughout the branch territory;

- Wholegoods distribution: this section employs 14 persons who stock and distribute machines to meet known and projected dealer requirements. Distribution of wholegoods is direct from the assembling factory whenever possible;

- Administration: this section of 21 persons handles record-keeping, bookkeeping, reporting, correspondence and other communications for the Saskatoon branch.

The last three sections are essentially support functions for the sales and technical services sections which work directly with dealers and users of MF machines.

District Managers

The duties of the district managers mentioned above are of particular interest. The district manager is MF's continuing and closest link to the dealer and the customer. In broad terms, the district manager is responsible for:

- dealer recruiting and training;

- territory administration;

- sales programming and implementation;
- representing the company in community activities in his district.

He routinely covers many subjects on each dealer call such as:

- reviewing the dealer's records;
- inspecting premises and inventory;
- considering status and performance of the various dealership departments, e.g., service, parts;
- reviewing in depth the condition of the business;
- reviewing collection follow-up;
- reviewing retail contracts;
- reviewing retail sales reports;
- taking wholesale orders;
- maintaining promotion program follow-up;
- following through on continuing training programs;
- counselling on retail financial plan administration;
- counselling on local advertising;

- helping arrange inventory transfers among neighboring dealers;

- handling complaints and other problems.

In addition, he handles three areas of special responsibility:

- dealer development: this usually means instructing dealer personnel in matters relating to business management, merchandising improvement and facility and service improvement. Typical programs are a simplified accounting system, self-service merchandising of high demand items, a repair parts inventory control system, a better equipped service department;

- retail assistance: this is retail sales training through joint canvassing of prospects and field demonstrations;

- special activities: examples are participation in dealer open houses, field demonstrations for large groups, local fairs, exhibits.

Regional Sales Offices and Branch Offices

Massey-Ferguson is presently in process of further specializing its branches. After the transition period is completed, what is known today as the branch office will be called a regional sales office.

Regional sales offices will concentrate their effort and attention on sales, service and training activities for the benefit of dealers. The regional sales office will also be the dealer's source of machinery repair and maintenance advice and assistance. Regional sales offices, of course, will also assist dealers in ordering wholegoods.

As indicated above, a branch manager today, through his subordinate managers, is responsible for sales, technical service, distribution and office administration. (Until the establishment of the North American Finance Operation (NAFO), which will be discussed in chapter X, the branch manager was responsible also for credit administration. Today, NAFO personnel are located at branches, as they will be at regional sales office, but are responsible to NAFO headquarters.)

As opposed to the branch manager's responsibilities, the manager of the regional sales office will:

- devote about 90 percent of his time to working with the dealers, and the district managers who serve them, in his region;

- retain his responsibility for providing machinery repair and maintenance assistance and advice;

- retain the administrative, i.e., paper work,responsibility for wholegoods distribution. The actual physical distribution

will be handled by "mixing" or distribution warehouses which will be discussed in chapter VII;

- have minimal administrative responsibility, a circumstance primarily attributable to computerization of records in the past prepared manually by branch staffs.

(To permit maximum concentration by the regional sales office on its newly enhanced responsibilities, parts ordering and parts distribution will become the specialized function of field warehouses formerly run as only one part of the branch.)

To assist him in these responsibilities, the regional sales manager's staff consists of his district managers and his retail development, service, distribution and administration managers.

Regional sales offices will help to increase sales and service support for dealers. Of equivalent significance is the counterpart separation and further specialization of physical wholegoods and physical and administrative parts distribution responsibilities. Overall, such a rationalization should produce faster and more effective service to dealers and their customers in each of the individual areas of responsibility spun off from the old branch-type organization.

According to present plans, by the end of 1968 there will be no branches in the U.S. Regional sales offices have already been established in Portland, Oregon; Des Moines, Iowa; and Stockton, California. Two more are called for before the end of 1967 at Nashville, Tennessee and Kansas City, Kansas. The experience gained in the U.S. should facilitate the same transformation in Canada by the end of 1969.

EVOLUTION OF MF RETAILING IN CANADA

For many years, Massey-Ferguson and its antecedent companies, retailed farm machinery through agents. The agent was in fact, and in law, a representative of the company. This relationship limited the freedom of action agents could enjoy. Many agents chafed under these conditions. In some cases, consequently, their reduced enthusiasm tended to curtail their effectiveness as retailers of the company's products. With time the entire agent-company relationship became less and less workable.

Moreover, there was a very large number of agents. Virtually every village had an agent as, perhaps, poor transportation and communication facilities then demanded. Most farm machinery agents did nothing but sell. Sales collection and service were company responsibilities. The company also carried most of the responsibility for providing parts.

For these reasons, doing business through agents was cumbersome and inefficient. In the 1930s and '40s for example, to provide the services

dictated under the agent-company system, MF had to maintain about 15 Canadian branches compared to the present five. The permanent staff at each numbered about 100. Temporary staff for retail collection and inventory taking in the fall nearly doubled this number.

Full records on branch staff personnel have not survived, but the above figures suggest that in the '30s and early '40s there was a total branch staff of around 1,500 persons in Canada plus an additional 1,500 temporary staff during each fall. This compares with a total of about 450 persons in 1966 who handled far more machines and far more parts and far more transactions than handled previously by 1,500.

Conversion from Agents to Dealers

To reduce field distribution costs, in 1944 the company began converting agents into dealers. This meant they had to assume responsibilities for displaying and selling machines, providing a comprehensive parts service and servicing the machines they sold. In turn, this greatly reduced the work load at MF branches and permitted a reduction in both the number of branches and of personnel. It also gave the agents-turned-dealers the freedom of action many of them wanted. They, in turn,created new retail businesses of benefit to many Canadian communities.

Before creating dealerships, however, the company carefully studied the problems involved. Criteria for successful transformation from agent to dealer were developed. The current retailing organization and the

market itself were analyzed. The objective of this analysis was to produce the ideal plan for retailing MF machines in Canada through dealers.

Many factors were considered. There were agents working alone from a one-car garage who were selling a few thousand dollars worth of machines a year. There were a few agents working with staffs of eight to ten people who were selling hundreds of thousands of dollars worth of machines a year. There were agents five miles apart and agents fifty or more miles apart. It was obvious that some agents were operating sub-marginally both from their own point of view and, more importantly, from the farmer's point of view in terms of availability of machines, parts and service.

From this study, it was possible to determine the attributes of a minimally successful agent, the moderately successful agent and the prosperous agent. Such factors as total business volume, number of employees, physical place of business and parts volume were considered and related to geographical and economic factors such as the number of farms in the main area served, the type of agriculture practised, the area's agricultural income, population of various farm machines and local competitive activity.

From this emerged a dealer profile which showed roughly how much business would be required to support a satisfactory dealership; one that could

stock a representative variety of MF machines, a workable stock of MF repair parts and that could support a repair shop, mechanics, sales representatives, clerical help, etc..

Each province was studied to pinpoint the areas with potential to support such a dealership. A map was produced to identify these areas without reference to the location of existing agents. In effect, it was the ideal --highly desirable, but probably unachievable.

Then, the locations of existing agents were plotted on the map. There were many discrepancies between the natural market areas and the distribution of agents that happened to exist there. Some areas had three or four agents, others had none. Some had an agent, but not sufficiently located. Two adjacent areas might each have an agent, with both close to each other near a boundary.

The performance of the agents was studied and related to this scrambled picture. Sub-marginal agents were discontinued and the picture studied again. Territories were redrawn and potentials recalculated within the new boundaries.

Finally, still far from perfect, but vastly improved over the previous agency situation, a new order was established. Not all agents were invited to become dealers. Not all of those invited wanted the change. There was both voluntary and planned attrition.

Commencing with an agent count of 1,957 in 1944, the agent-to-dealer change reduced the dealer count to 1,350 by 1950. By 1960 the count was 886. As of October 31, 1966 the total was 720. (Saskatchewan, 193; Ontario, 138; Alberta, 132; Quebec, 104; Manitoba, 78; British Columbia, 23; New Brunswick, 22; Nova Scotia, 20; Prince Edward Island, 9; Newfoundland, 1.)

DEALER TRENDS IN NUMBERS AND VOLUMES

The following tables establish some ot the more important trends of MF's dealership organization. The table below shows the reduction of MF retail outlets in Canada over the last three decades. Today there are about a third as many as in 1935.

Number of Canadian Agents or Dealers
(selling MF products all or part of year shown)

1935	2,296
1939	2,094
1944	1,957
1950	1,350
1960	886
1965	776
1966	754

The average MF dealer's dollar volume has increased in recent years. In 1965, the average Canadian MF dealer did $84,964 in new MF wholegoods business at wholesale value. His parts purchases were approximately $12,500. In 1966 average MF wholegoods sales increased to $87,989 and parts purchases were about $14,400. In the U.S., MF dealers lagged behind Canadian dealers in 1965 with $78,831 in new wholegoods at

wholesale. In 1966, however, average U.S. sales spurted to $97,963. The parts volumes in the U.S. were virtually the same as in Canada.

Part of the increasing average dealer dollar volume is due to increased sales; part of it is a function of the smaller number of dealers; part of it is a function of the price of the increasingly complex and powerful machinery which the farmer needs to optimize his farming operations; and part of it reflects the inflationary increase in labor, materials and transportation costs over the last decade.

The next table shows ,by dollar-volume groupings, the number and percentages of total dealerships in relation to the percentage of total MF dealer new wholegoods sales. In general, these data show the basic trend toward fewer but larger volume dealerships. They also show a phenomenon which might be considered a consequence of the basic trend, namely, that a relatively few top dealerships are producing more and more of the total volume.

For example, in Canada in 1966, those dealers with volumes of $200,000-plus (7.8 percent of all MF Canadian dealers) produced 25.5 percent of total new MF wholegooods dealer volume. (The company cannot offer a comparison from earlier years for Canadian dealers. Earlier records on U.S. dealers do exist, however, which show that in 1961 the $200,000-plus groupings were only 3.0 percent of all U.S. dealers. In that year, 14.3 percent of MF sales in the U.S. were by that group.) Such a trend, and

Wholegood Dollar-Volume Groupings of MF Dealers in North America

Dealer Settlement for MF Wholegoods by Volume Groups	MF Dealers by Volume Groups Number 1965	1966	Percent 1965	1966	% of total MF Settled Volume by Dealers 1965	1966
Canadian Dollars			CANADA			
$ 0- 19,999	131	133	16.8	17.6	1.9	1.6
$ 20- 29,999	65	56	8.4	7.4	2.5	2.0
$ 30- 49,999	113	94	14.6	12.5	6.9	5.4
$ 50- 74,999	108	112	13.9	14.9	10.2	10.4
$ 75- 99,999	118	94	15.2	12.5	15.3	12.2
$ 100- 199,999	186	206	24.0	27.3	39.3	42.9
$ 200- 299,999	34	41	4.4	5.4	12.1	14.8
$ 300- 399,999	15	12	1.9	1.6	7.6	6.6
$ 400- & over	6	6	.8	.8	4.2	4.1
TOTAL	776	754	100.0%	100.0%	100.0%	100.0%
			UNITED STATES			
U.S. Dollars						
$ 0- 19,999	461	362	23.1	19.2	2.2	1.5
$ 20- 29,999	167	129	8.4	6.8	2.6	1.8
$ 40- 49,999	297	269	14.9	14.2	7.5	5.8
$ 50- 74,999	294	243	14.7	12.9	11.4	8.1
$ 75- 99,999	216	197	10.8	10.4	11.8	9.3
$ 100- 199,999	411	451	20.6	23.9	37.5	34.6
$ 200- 299,999	104	151	5.2	8.0	15.9	20.0
$ 300- 399,999	30	56	1.5	3.0	6.4	10.4
$ 400- & over	15	31	.8	1.6	4.7	8.5
TOTAL	1995	1889	100.0%	100.0%	100.0%	100.0%

the converse which it must create for dealers in the lower dollar-volume groupings, are not simply explained.

It is perhaps reasonable to suggest, however, that these trends stem primarily from a combination of the following factors: fewer farms; site of individual dealership in relationship to farm machinery competition; location of the individual dealerships in relationship to the nature and quality of agriculture locally practised; and, in simplest terms, the tendency for the "rich to get richer and the poor to get poorer", which in economic terms might roughly be stated to the effect that the dealer who started on a better footing could better afford to optimize his operation --and in the course of so doing inceasingly benefited from the operating efficiencies he was able to induce through capital infusions.

This somewhat tenuous pattern of explanation ignores the imponderable human factor. At the risk of oversimplification, MF believes it is resonable to state that some men are better businessmen than others. Regardless of such causes, the top MF dealers can be described with fair accuracy as tough, knowledgeable, skillful competitors. It is, of course, impossible to measure these characteristics directly. They must be estimated in terms of the dealers's total performance in the market place.

Dealership Reduction

As indicated above, the total number of MF retail outlets has been substantially reduced over the last 30 years. One factor in this reduction was the change itself from agents to dealerships; another was improved transportation and communication facilities; and the declining number of farms and farm machines is still another. It has been company policy not to replace a dealer in a sub-marginal market area if he retires, decides to close his business or decides to change his primary allegiance to a competitive manufacturer. These circumstances largely explain the company's dealership attrition.

However, individual dealerships are terminated from time to time because of unsatisfactory business volumes, service or credit performance. The dealer, through his sales agreement with the company, is responsible for the development of the maximum volume of sales of company products in his area. Such sales, possible only through adequate dealer representation, benefit not only the company but the dealer as well. If he does not achieve such representation the company or the dealer has the right to terminate the sales agreement.

MF believes this is a reasonable policy. Indeed, the Alberta Retail Implement Dealers' Association, in its brief to this Royal Commission last spring, repeated its recommendation that small, ineffecient dealerships should be discontinued pointing out that "grocery store" dealers who do not offer replacement parts and servicing for the equipment they

sell add to the farmer's downtime. MF agrees.

MF dealership reduction has occurred gradually and over a period of years. The company's foremost consideration in such actions has always been the meeting of its own and its dealers' obligations to the eventual consumer.

CHARACTER OF DEALERSHIPS

In the following passages MF shall describe some of the characteristics of its Canadian dealerships and, where they are significant, make comparisons with the whole of its North American dealership organization.

Descriptions of the typical manner of organization, various categories of necessary investment, profitability, handling of used machinery, and development of service, sales and dealership personnel are also included.

Functional Organization of Dealerships

It is perhaps impossible to generalize accurately with regard to the internal organization of MF's 700-plus Canadian dealerships. However, most would be found to have some internal delineation between the owner-manager who performs the expected long-range planning, higher-level problem solving and decision making as well as the normal proprietary administrative tasks. He, of course, depending on the size of his dealership and his own inclinations, may be active in the day-to-day

conduct of other functions.

These other functions invariably include sales, parts and service. Each of these three functional areas, depending on the size of the dealership, may operate solely with its own personnel or there may be an overlapping. For example, the service department is typically the first function to require specialized personnel. These men, of all dealership employees, are least likely to be used for other functions.

A large, fully developed dealership might have sub-divisions within its basic functional area, e.g., parts ordering and sales as contrasted with parts storage; and separate physical facilities for pressure cleaning and painting machinery, in addition to other separate space for machine maintenance and repair.

A well-developed dealership should also have a centrally located area for salesmen to assist incoming customers; a self-service area for hardware-type items; a separate parts service counter with an immediately adjacent parts storage area; an inside display for new machinery; a roofed-over outdoor display area for new and reconditioned machinery; and a roofed-over area for storage and assembly. In such a dealership personnel would tend to be relatively specialized.

A large dealership might have about 15 employees. The smallest probably operate with only three or four men. In 1966, seven employees was about

average. The exact dimension and organization of each dealership is no doubt unique in some regard. This may be in response to local competitive pressures or other equally compelling causes.

MF does, of course, provide advice to the dealer on details of organization, the business-like running of his operation and the integration of the two with an appropriate physical plant. However, the dealer is an independent businessman. His is the ultimate choice. With him, however, MF shares the responsibility for ensuring that the customer receives the service he requires.

Dealer Investment and Financial Results

Each year MF invites all MF dealers to participate in an operating statement and balance sheet study of their previous year's activities. However, due to differences in bookkeeping procedures, lack of formal bookkeeping, lack of time, etc., response to the survey has been about 15 percent or 100 to 110 Canadian dealers. These respondents cannot be considered a truly random sample; rather, those who do participate in the survey probably tend to be the more skillful and knowledgeable businessmen who, consequently, have achieved stronger financial positions than those who do not respond.

However, it should also be borne in mind that certainly not all of the approximate 15 percent of participating dealers were in the top 15 percent of all dealers volume-wise. With these qualifications, the following presents the results of the 1966 survey, the most recent available.

1966 Dealer Balance Sheet Averages

Balance Sheet Accounts	Responding North American Dealers Amount	%Assets	Responding Canadian Dealers Amount	%Assets
Cash and Securities	8,597	4.0	8,562	4.1
Notes and Accounts Receivable	25,630	11.9	23,051	11.1
Inventories	145,841	67.7	140,331	67.5
Prepaid Expenses	1,460	.7	7,273	3.5
Current Assets	181,528	84.3	179,217	86.2
Fixed Assets - Net	28,144	13.0	24,873	12.0
Other Assets	5,887	2.7	3,767	1.8
Total Assets	215,559	100.0	207,857	100.0

Balance Sheet Accounts	Responding North American Dealers Amount	%Assets	Responding Canadian Dealers Amount	%Assets
Current Liabilities	119,421	55.4	116,489	56.0
Long Term Liabilities	21,525	10.0	27,332	13.2
Total Liabilities	140,946	65.4	143,861	69.2
Net Worth	74,613	34.6	63,996	30.8
Total Liabilities and Net Worth	215,559	100.0	207,857	100.0

Profitability

The following table, from the same study, shows operating averages for MF participating North American and Canadian dealers.

1966 Dealer Operating Averages

Operating Accounts	Responding North American Dealers		Responding Canadian Dealers	
	Amount	%Sales	Amount	%Sales
SALES				
New Equipment	268,194	61.0	276,596	57.1
Used Equipment	79,995	18.2	109,870	22.7
Total New & Used	348,199	79.2	386,466	79.8
Parts and Accessories	57,328	13.0	57,056	11.8
Customer Labor	14,287	3.3	13,945	2.9
Miscellaneous	19,632	4.5	26,817	5.5
TOTAL SALES	439,436	100.0	484,284	100.0
GROSS PROFIT				
New Equipment	32,207	12.0	33,937	12.3
Used Equipment	(385)	(.5)	(5,213)	(4.7)
Total New & Used	31,822	9.1	28,724	7.4
Parts and Accessories	14,960	26.1	14,706	25.8
Customer Labor	4,535	31.7	5,472	39.2
Miscellaneous	3,499	17.8	5,245	19.6
TOTAL GROSS PROFIT	54,816	12.5	54,147	11.2
PROFIT BEFORE INCOME TAX	14,450	3.3	14,009	2.9

Perhaps the most noteworthy comparison from this table is the lower profit before income tax of the Canadian respondents. This is partially explained by their losses on used machinery sales. Dealers' selling margins are, of course, a matter between him and his customer.

1966 Dealer Selling Expenses

Expense Accounts	Responding North American Dealers Amount	Responding North American Dealers %Sales	Responding Canadian Dealers Amount	Responding Canadian Dealers %Sales
SELLING				
Salaries & Commission	5,209	1.2	5,385	1.1
Travel	737	.2	784	.2
Advertising	1,907	.4	2,054	.4
Demonstrations	406	.1	775	.2
Policy & Warranty	1,171	.3	1,602	.3
TOTAL SELLING EXPENSE	9,430	2.2	10,600	2.2
EXPENSES GENERAL				
Salaries - Officers, Owners	8,220	1.9	9,937	2.1
Mechanics Labor - Unapplied	2,411	.5	1,442	.3
Salaries - Partsmen	4,237	1.0	3,862	.8
Salaries and Wages - Other	5,417	1.2	6,188	1.3
Employees Fringe Benefits	1,211	.3	1,303	.3
Travel and Entertainment	507	.1	611	.1
Company Vehicle Expense	2,510	.6	1,517	.3
Heat,Light,Power and Water	1,044	.2	1,028	.2
Occupancy Expense	2,293	.5	2,321	.5
Maintenance and Repairs	794	.2	1,113	.2
Tools and Shop Supplies	1,484	.3	1,246	.3
Taxes and Licenses (Except Income Taxes)	2,653	.6	913	.2
Freight and Express	1,405	.3	938	.2
Telephone and Telegraph	1,192	.3	1,000	.2
Membership Dues and Subscriptions	168		137	
Office Supplies and Postage	639	.1	670	.1
Insurance	1,939	.4	1,107	.2
Legal, Auditing and Professional Services	651	.1	912	.2
Interest and Bank Charges	1,836	.4	1,300	.3
Charitable Contributions	96		50	
Miscellaneous	516	.1	527	.1
Bad Debts	1,244	.3	1,238	.3
Depreciation	2,244	.5	2,516	.5
TOTAL GENERAL EXPENSES	44,711	10.1	41,876	8.6
TOTAL ALL EXPENSES	54,141	12.3	52,476	10.8
OPERATING PROFIT (LOSS)	675	.2	1,671	.4
Other Income and Deductions	13,775	3.1	12,338	2.5
PROFIT (LOSS) BEFORE INCOME TAXES	14,450	3.3	14,009	2.9

Canadian dealers appear to take slightly more in owners' and officers' salaries than their U.S. counterparts, and employees' salaries are slightly lower in Canada as a percentage of sales.

For general comparative purposes, the following table shows average ratios and percentages for all North American respondents and for Canadian respondents:

Average 1966 MF Dealer Ratios and Percentages

Category	MF North American Dealers	MF Canadian Dealers
Working Capital	$62,107	$62,728
Current Ratio	1.52X	1.54X
Working Capital Turnover	7.1X	7.7X
Inventory Turnover	2.6X	3.1X
Equity Ratio	34.6%	30.8%
Equity Turnover	5.9X	7.6X
Return on Sales	3.3%	2.9%
Return on Net Worth	19.4%	21.9%
Total Asset Turnover	2.0X	2.3X

In MF's opinion, a major problem in providing the farmer the total service he requires is attracting qualified businessmen as dealers in view of the relatively low return on sales.

The surveys from which the above tables were derived in themselves help provide some guidance in the recruiting of new dealers. For example, by correlating the level of operating success of individual respondent dealers and their pattern of financial operation against the characteristics of their market areas, it is possible to develop the theoretically desirable relationship between a potential new dealer's facilities and staff and the adequacy with which they can serve the potential market in question.

The surveys may also provide valuable clues to the solution of operating problems encountered in one area but apparently absent or overcome in another. One such problem today is the unprofitability of handling used machinery, particularly in Canada, where dealers with under $250,000 in total annual sales lost 10.9 percent on their used equipment sales. Dealers in the quarter-to-half-million-dollar range showed a 19.5 percent loss on used equipment, cutting their before-tax profits in half. Dealers with total sales volumes of over half a million dollars lost 1.2 percent on their used sales.

U.S. dealers, however, at all total volume levels, generally show small gross operating profits on used equipment. The U.S. dealers show results from a 5.1 percent loss to a 7.2 percent profit depending on geographical region and total volume.

Thus, the used farm machinery market in Canada might fairly be labeled sluggish. Perhaps the sluggishness stems from the overall trend of more farmers with more --but smaller and less powerful-- machines to fewer farmers requiring fewer but more powerful machines. Stated differently, the very nature of current changes in farming trends to reduce demand for used machinery, i.e., used machinery characteristics have been rendered obsolescent or obsolete by changes in machinery needs induced by agricultural economics.

Still, U.S. dealers, as revealed by one of the above tables, fare better in used machinery dealings than their Canadian counterparts. MF can suggest two contributing causes. One is the shorter "technological gap" between used and new machinery in the U.S. as compared to that which might typically be found in Canada or, put another way, used machinery in the U.S. tends to be newer than in Canada, and, consequently, U.S. farmers are less reluctant to buy it.

A second, and perhaps related, explanation was suggested to this Commission last spring in Calgary by a dealer; namely, that dealers allow too much for trade-ins, more than the dealer has a hope of recovering at re-sale. In its simplest form, this appears to be the problem. Variances in accounting practices may also create apparent differences.

Dealership Personnel Development

Earlier in this chapter, during discussion of the responsibilities of

the marketing retail development division and of district managers, mention was made of MF's role in providing a wide variety of instructional assistance to the dealer and his employees. MF offers this training because it believes such training is necessary to help enable the dealer and his staff to compete successfully. Stated differently, successful competition is predicated upon customer satisfaction which will be achieved only if the dealership provides the fastest and most complete service of all descriptions locally available.

The dealer's ability to perform with such excellence requires more than desire. It requires knowledge of, and the ability to apply, modern business techniques throughout his dealership. It also requires a high level of technical competence among his staff, particularly his service personnel.

The dealer is constantly faced with the problem of recruiting qualified staff, men with the characteristics which in a relatively short time will enable them to contribute to the dealer's ability to serve the farmer. Such men are not easily found. This situation is intensified by the flow of rural North American talent to the cities. This makes it increasingly difficult for the dealer to attract the men he needs. He is at a disadvantage in competing with larger employers who typically offer more attractive working conditions, wages and benefits.

In an effort to assist the dealer in this regard, last year MF arranged a life insurance and retirement program for dealers to use as a personnel recruiting and retention tool. The long-range results of this first-in-the-industry program are not yet clear. Whatever they might be, the dealer will continue for some time to have personnel problems based essentially on the rural-urban flow and the causal factors underlying it.

Massey-Ferguson, of course, cannot enter into the actual recruitment of dealers' employees or dictate their conditions of employment. The company can, however, do certain things to abate the dealer's personnel problem. Some of these have already been stated, e.g., actual courses and instruction overseen by MF district manager at the dealership site. Another example is company cooperation with the Saskatoon Institute of Applied Arts and Sciences in its two-year course for the training of farm machinery mechanics. This is a joint venture drawing support from a number of manufacturers and dealer associations. In addition, a professor of agricultural engineering from the University of Saskatchewan participates on the advisory committee. MF also provides formal, classroom instruction for its dealership personnel at the North American Training Centre which is discussed later in this chapter.

In these ways, MF believes, it is demonstrating recognition of its obligation --indeed, its own self-interest-- in contributing to the dealer's ability to recruit, upgrade and retain a qualified staff.

THE DEALER SALES AGREEMENT

The four-page agreement (following this page) establishes the legal basis on which business is done between Canadian dealers and MF. Before commenting on the terms of the agreement itself, it may be instructive to sum up the factors assessed in reviewing a dealership application:

- the potential for sales of MF products in the particular trade area;

- the personal attributes of the prospective dealer himself, including his market knowledge, ability as a salesman, knowledge of MF farm machinery, management and merchandising abilities and his past experience in the retailing of farm machinery;

- facilities and equipment that the dealer will be using in the operation of his dealership, e.g., building space for the sales, service and storage of machinery and parts, service shop equipment, and staff including salesmen, servicemen and bookkeeper;

- capital and financing which should include the necessary working capital to operate the business, fixed assets, financial reputation in the community and credit worthiness.

Massey-Ferguson Industries Limited

DEALER SALES AGREEMENT

This AGREEMENT is made in triplicate by and between ....

....

(State whether an individual, partnership or corporation. If the latter, show name of Province in which incorporated)

doing business as ....

(Trade Name if Individual or Partnership)

.... and with a principal place of

business at ....

(Street Address) (City or Town and Postal Zone)

....

(County) (Province)

(hereinafter called "Dealer"), and Massey-Ferguson Industries Limited, a Company incorporated under the laws of Ontario with its principal place of business at Toronto, Ontario, (hereinafter called "Company").

1. SELLING RIGHTS OF COMPANY PRODUCTS:

a. The provisions of this agreement during the effective duration hereof shall apply to all Company Products (which shall include the products of its affiliated or associated Massey-Ferguson companies), offered for sale to Dealer by Company, delivered to or for the account of Dealer by Company through its office servicing the territory in which Dealer is located.

b. In consideration of the faithful performance by Dealer of the undertakings set forth herein, Dealer is hereby granted the right to purchase Company Products for the effective period of this agreement. The trade area tributary to Dealer's principal place of business shall be considered the area in which Dealer is primarily responsible for development of the maximum volume of potential sales of Company Products. This area is not exclusive to Dealer and Company reserves the unrestricted right to sell Company Products to anyone, anywhere.

c. Dealer recognizes its responsibility to maintain a suitable business organization adequately stocked with Company Products for the purpose of conducting the business of the dealership as a retail selling operation to the best of Dealer's ability in accordance with Company policies set forth herein or as otherwise announced from time to time.

2. CONDITIONS OF SALE OF COMPANY PRODUCTS:

a. Company Products are sold by Company to Dealer under this agreement on the following conditions and Company's liability and obligations shall be determined accordingly:

(i) Delivery of Company Products to Dealer shall be effected when the Company has made delivery to a common carrier or anyone designated by Dealer for shipment to Dealer and Dealer will assume all charges, costs and risks incurred thereafter, including the charges resulting from the diversion of shipment by Company or Dealer caused by Dealer's refusal or failure to accept the shipment of Company Products on Dealer's order or orders. Freight charges on all shipments to Dealer will be paid by Dealer in accordance with the provisions of the published Schedule of Discounts and Terms.

(ii) Company reserves the right to route all shipments but will endeavor, whenever practicable, to follow Dealer's requests with respect to routing and mode of transportation.

(iii) Company will ship Company Products ordered by Dealer as and when available and shall not be responsible for failure or delay in shipment of any Company Products due to circumstances beyond Company's reasonable control, neither will it be responsible for shortages, delays or damages occurring in transit. Any claims against Company for shortages in delivery to the carrier must be made within 15 days after receipt of shipment by Dealer.

(iv) Legal title, with right of possession for default, to all Company Products sold to Dealer on credit terms under this agreement shall remain in Company until full purchase price has been paid to Company. Prior to full payment to Company, Dealer shall have no right to sell or dispose of any Company Products except for value received in the ordinary course of business and then only upon express condition that before delivery to a third party Dealer shall secure full settlement in cash or cash and lien note or notes or other property in form satisfactory to Company and such cash and lien note or notes or other property, if not otherwise effectively secured to Company, shall be deemed to be the property of Company in lieu of Company Products so sold by Dealer and shall be held in trust for Company subject to Company's order, and not commingled with any of Dealer's own funds, notes or other property. At any time upon request, Dealer shall give Company full information regarding Company Products and other property in Dealer's possession or sold by Dealer and/or the proceeds thereof.

b. (i) Prices, terms and discounts applying to all transactions and dealings between the parties hereto shall be those established by Company in its published Price Lists and accompanying Schedule of Discounts and Terms (or any subsequent revision thereof) which are hereby made a part hereof with the same force and effect as if set forth at length herein. V

(ii) Such prices, terms and discounts and all other Conditions of Sale of Company Products may be altered at any time and from time to time without notice by Company. In the event that Company changes prices, terms and discounts, Dealer may cancel any unshipped order on hand with Company by so notifying Company within ten (10) days from date of dispatch of notification of change by Company. If no such notification of cancellation is received by Company, all unshipped Dealer's orders shall be shipped according to the revised prices, terms, discounts or conditions of sale.

c. If Company reduces the published list price of any Company Products other than parts, purchased by Dealer under the Terms of this Agreement and carried in Dealer's stock unsold and unused other than as authorized by Company, Company will refund to Dealer or credit to his indebtedness to Company as it sees fit an amount equal to the difference between the price Dealer is obliged to pay or the obliged price paid and the reduced amount then payable for the same, provided that if Dealer has not received such refund or credit within 30 days from the date of announcement of the price reduction, Dealer must notify Company in writing within 15 days thereafter of his claim for such refund. Company, at any time, in its sole discretion, may require Dealer to submit to Company any claim for such refund in writing, properly documented with supporting data within 15 days from the date of such request by Company and any such claim shall be subject to Company audit. In the case any interest in any such Company Product has been assigned by Dealer, Company reserves the right to pay the price reduction allowance or any part thereof to the assignee.

d. Company has effected insurance covering its interest in Company Products and other property shipped to or held by Dealer. Company reserves the right to discontinue this insurance upon 30 days' advance notice to Dealer. A summary of insurance coverage will be supplied to Dealer upon request.

e. Company, at its sole discretion, may:

(i) Improve, modify, discontinue or replace any Company Products or parts thereof at any time and from time to time without incurring any obligation to replace or make corresponding changes on any Company Products previously shipped to Dealer and without incurring any other obligation or liability.

(ii) Apply, as it sees fit, any funds or credits of Dealer, including those that may result from repurchases by Company from Dealer, that are in the possession or custody of Company against the debts of Dealer owing to Company.

3. DEALER'S OBLIGATIONS:

Dealer specifically agrees:

a. To promote, primarily in Dealer's trade area, in every reasonable manner to the satisfaction of Company and at Dealer's expense the sale of Company Products.

b. To employ adequate and competent help to handle all sales, service, administrative and educational activities of the dealership to Company's reasonable satisfaction.

c. To avoid any sales policies, trade practices and advertising that would, in Company's opinion, be injurious to the reputation and goodwill of Company.

d. To pay for Company Products in the manner prescribed by Company from time to time in then current Schedules of Discounts and Terms issued by Company at prices specified by Company in Price Lists issued by Company current at the date of shipment.

e. That Company is hereby authorized to correct and/or complete and/or fill out and sign any orders from Dealer for Company Products in accordance with current Schedules of Discounts and Terms and Price Lists with full authority to bind Dealer accordingly.

f. That all cash and other property received by Dealer in anticipation of future deliveries by Dealer of any Company Products or other property unpaid for by Dealer to Company will be accepted by Dealer only in trust and that all such cash will be kept as a trust fund in a separate bank account and not commingled with any of the Dealer's own funds and that Dealer will hold all such items only in trust and will not place any lien on such other property nor sell the same without immediately placing and thereafter retaining in such trust fund in the separate bank account an amount equal to the trade-in allowance applicable thereto until payment is made to Company in full for such Company Products or other property.

g. To furnish Company with a guarantee bond, at Dealer's expense, for an amount and in a form satisfactory to Company to secure Company against failure of performance by Dealer of any of Dealer's obligations in respect of money or other property received by Dealer as a trustee for Company under this agreement.

h. To provide at Dealer's sole expense for adequate storage facilities to protect all Company Products and other property in Dealer's possession in which Company has an interest.

i. To reimburse or indemnify Company for or against all taxes payable in connection with sales by Company to Dealer hereunder, sales by Dealer, and Dealer operations. Any such taxes paid by Company may be billed by Company as separate items or included in the price of Company Products shipped to Dealer.

j. To pay all taxes assessed in respect of Company Products purchased by Dealer promptly when due. If Dealer fails to pay such taxes, Company may do so and Dealer agrees to pay the amount thereof to Company forthwith.

k. To allow Company representatives to enter and examine Dealer's place of business, inventories, accounting records and facilities at all reasonable times.

l. To furnish to Company at the close of Dealer's business year and at any other time at Company's request such financial and operating statements as Company may reasonably require.

m. Not to use the name "Massey-Ferguson" or any part or parts or combination or abbreviation thereof or any name, trademark, trade name, insignia or slogan owned or adopted by Company or any of its associate companies including without limiting the generality of the foregoing "Massey-Harris", "Massey-Harris-Ferguson", "Ferguson", "Ferguson System", "MH", "MHF", "MF" or "HF". V

n. Not to contest Company's title to its trademarks, copyrights and registrations used in connection with Company Products and not to take any action to the detriment of Company's interest therein.

o. Not to effect, or permit, the removal, renewal or alteration of any patent numbers, trade names or marks, notices, name plates or serial numbers affixed to any Company Products by Company.

p. That it is not and shall not represent itself to be Company's agent for any purpose and shall not incur any obligation or make any promises or representation on Company's behalf.

4. GENERAL CONDITIONS:

The following general conditions apply to this agreement:

a. Company enters into this agreement in reliance upon the accuracy of the statements and representations which Dealer has made to Company prior to execution hereof.

b. Dealer acknowledges that no representations or statements have been made to him which would modify or tend to modify any of the provisions of this agreement in any way. All prior agreements and oral or collateral agreements heretofore or hereafter made and purporting to modify the provisions of this agreement shall have no force or effect. No representative of Company has authority to waive any provisions or to modify or to change the terms of this agreement excepting only by a supplemental written agreement executed by duly authorized Officer of Company and by Dealer.

c. It is not assignable by Dealer but shall enure to the benefit of the successors and assigns of Company.

d. It shall not be valid or binding unless and until signed on behalf of Company by duly authorized Officer of Company and an executed copy hereof is delivered to Dealer.

e. It is to be governed by and construed according to the laws of the Province of Ontario.

f. If any provision of this agreement or the application of such provision shall be held illegal or unenforceable under any laws of any jurisdiction applicable to this agreement, the remainder of this agreement or the application of such provision to other persons or circumstances shall not be affected thereby.

g. No departure from or waiver of the terms of this agreement shall be deemed to authorize any prior or subsequent departure or waiver and Company shall not be obligated to continue any departure or waiver or to permit any subsequent departure or waiver.

h. Any notices required to be given by either party to the other under or in connection with this agreement shall be in writing and shall be deemed to have been given when delivered personally or when posted by registered or certified mail. Notices to Dealer shall be directed to Dealer at Dealer's last known place of business as indicated in the records of Company; notices to Company shall be directed to the address of the Branch Office of Company which serves Dealer.

5. TERMINATION OF AGREEMENT:

This agreement shall continue in effect until terminated either by mutual consent of the parties hereto or by either party giving written notice of termination to the other party, provided, however, that:

a. When termination is to be effected by written notice given by Company, such notice shall be given 90 days prior to the effective date of termination, but when effected by written notice given by Dealer such notice shall be given 30 days prior to effective termination date.

b. The Agreement Shall Immediately and Automatically Terminate Without Notice or Other Act:

(i) Upon the attempted assignment by Dealer of this agreement or any of Dealer's rights or obligations hereunder.

(ii) Upon commencement of any occurrence connected with dissolution or liquidation of Dealer.

(iii) If Dealer commits any act of bankruptcy as defined by the Bankruptcy Act, or is adjudicated bankrupt or becomes insolvent or takes the benefit of any Act that may be in force for bankrupt or insolvent debtors.

(iv) Upon the death of Dealer, if an individual, or the death of a partner if Dealer is a partnership.

c. The Agreement May be Terminated Immediately by Notice Given to Dealer by Company:

(i) Upon the violation by Dealer of any provision of this agreement.

(ii) Upon any change as to the direct or indirect ownership or active management of Dealer without the prior written consent of Company, which in the opinion of Company is materially detrimental to the interests of Company.

6. RESULTS OF TERMINATION:

Upon the termination of this agreement for any cause:

a. All unshipped orders for Company Products from Dealer shall be cancelled without liability on the part of either party.

b. All indebtedness of Dealer to Company shall become immediately due and payable and Company may establish cash on delivery terms on any Company Products which may be shipped after notice of termination has been given.

c. Dealer will remove and discontinue the use of all signs, stationery, advertising and other material, and refrain from any conduct that would make it appear to the public that Dealer is still dealing in Company Products.

d. Company may negotiate or consummate arrangements for a successor dealer prior to date of termination.

e. Neither party hereto shall become liable to the other for loss or damage of any kind whatsoever on account of or arising directly or indirectly because of any termination of this agreement, all rights and claims of that nature being hereby unconditionally and irrevocably waived by both parties to this agreement.

7. REPURCHASE BY COMPANY OF DEALER'S STOCK ON TERMINATION:

a. In the event of termination of this agreement, Company agrees to repurchase from Dealer, and Dealer agrees to sell to Company free and clear of all liens and encumbrances, all saleable new and unused Whole Goods, Attachments and Accessories listed in Company's published current Machine Price List, other than those designated therein as Discontinued Products, and all saleable new, unused and undamaged parts listed in Company's published current Parts Price List, sold and delivered by Company to Dealer under this agreement remaining unsold at Dealer's premises. The repurchase price shall be the f.o.b. shipping point Billing Price charged to Dealer, after deducting all discounts and reductions allowed, less a charge which, in the case of Whole Goods, Attachments and Accessories shall be 5% thereof and in the case of Parts shall be 15% thereof.

b. Company shall also repurchase and Dealer shall sell:

(i) All current undamaged, usable catalogues, price lists, service bulletins, owner's manuals, advertising and sales promotion material furnished by Company. The repurchase price shall be equal to Company's original f.o.b. shipping point Billing Price to Dealer less a charge of 15% thereof.

(ii) All undamaged removable business signs furnished by Company. The repurchase price shall be equal to Company's original f.o.b. shipping point Billing Price to Dealer, less a charge of 20% per year or fraction thereof.

c. Freight and Handling Charges on repurchased items shall be borne as follows:

(i) Whole Goods, Attachments and Accessories will be delivered to Company at Dealer's place of business and Company will reimburse Dealer for all normal freight and handling charges originally incurred by Dealer at time of shipment from Company. All costs and risks after delivery to Company will be borne by Company.

(ii) Parts, catalogues, price lists, service bulletins, owner's manuals, advertising and sales promotion material, removable signs will be delivered to Company, properly packed and crated by Dealer at his own expense, at a destination determined by Company. Company will reimburse Dealer for freight costs so incurred that exceed normal costs of shipping such goods to its Branch Office that serves Dealer's area. Company will also allow Dealer all normal freight and handling charges originally incurred by Dealer at time of shipment from Company in respect of Parts items only.

d. Company shall be released from its obligation to repurchase any of the foregoing items if, within 30 days from the effective date of termination, Dealer is unable to deliver same to Company with satisfactory evidence or warranty of clear title thereto free of all liens and encumbrances. Dealer undertakes to comply with all applicable laws (including Bulk Sales Act) affecting the repurchase.

IN WITNESS WHEREOF, Dealer has executed this Agreement at ....

.................................., this ...., day of ...., 19...

....
Dealer's Trade Name

By ....
Title

By ....
Title

....
Witness

By ....
Title

By ....
Title

Approval and execution of Agreement by Company recommended this .... day of ...., 19.....

from .... Branch by ....
Massey-Ferguson Industries Limited — Manager

This Agreement is executed on behalf of Massey-Ferguson Industries Limited by its duly authorized Officer, this

day of ...., 19......, which date shall constitute the effective date of this Agreement.

Massey-Ferguson Industries Limited

....
Witness

....
Authorized Officer

AF-354-Cdn. (Rev. 11/64

From a consideration of these factors the company must decide whether or not to enter into the sales agreement. MF does not enter such agreements lightly. It enters them full recognizing that such an agreement is only a starting point in furthering MF's market penetration --and realizing that such penetration will require many acts of assistance and advice to enable the dealer to serve his customers successfully.

The agreement which initiates this relationship covers the following topics:

- selling rights of the company's products;
- conditions of sale of the company's products;
- the dealer's obligations;
- general conditions;
- termination of the agreement;
- results of termination.

The section on selling rights of the company's products establishes the dealer's responsibility for market development of the company's products in his principal trade area. It indicates the willingness of the company to sell to the dealer, and conversely the dealer's right to buy from the company. It establishes the dealer's responsibility to maintain a

suitable business organization adequately stocked with the company's products and conduct a retail selling operation in accordance with company policies.

The section on conditions of sale of company products covers transfer of responsibility from the company to the dealer upon shipment; transfer of costs and risks; assumption of freight charges; methods of shipping; choice of carriers; responsibility for losses, damage, shortages and delays. It covers legal ownership of products purchased on credit by the dealer, establishment of separate accounts to receive payments relative to products purchased on credit and still legally owned by the company. It establishes the basis and operation of prices, terms, discounts; the effect on the dealer of price increases or decreases; the extent of and reporting of insurance carried on products on the dealer's premises; the company's policies on improvement, modification or discontinuance of products or parts; and the application of bonuses, funds or credits of the dealer against his debts to the company.

The third section outlines the dealer's obligations to the company in the operation of the business. In effect, the company asks the dealer to develop the maximum volume of potential sales of its products in his trading area which is not defined or restricted; to maintain a representative inventory of the company's products which will find use in his market; and to maintain an adequate and sufficient parts inventory for all company products in use in the area.

The agreement requires him to employ competent and adequate help to handle service, sales, administrative and educational activities by arranging participation of personnel in training programs offered by the company. It permits the company to correct, complete or fill out and sign orders from the dealer for company products with full authority to bind the dealer to the resulting obligation. This permits the dealer to order by telephone and is useful to him particularly in ordering parts or in amending an order he has placed for a machine on which a customer wants to change specifications but still wants his original delivery date.

Other items covered in the agreement deal principally with use or abuse of company trademarks, use or abuse of company serial numbers, name plates, access to dealer's property and records, storage of inventory and the furnishing of a guarantee bond in respect to money or other property received by the dealer as a trustee for the company under the agreement.

General conditions are concerned with accuracy of disclosures at the time the agreement is consummated, assignment of the dealership, handling of exceptions and legal notice of whatever kind by either party.

In no section of the agreement is the dealer enjoined from handling products of other manufacturers whether complementary or competitive.

In fact, many MF dealers throughout Canada handle competitive lines such as New Holland, New Idea, Versatile, Robin and Morris.

Adequate Representation

Sections 1 and 3a of the agreement provide in effect that the dealer's sales activity is not restricted to his immediate trade area although the dealer agrees to be primarily responsible for the development of the maximum volume of sales of company products in that area. He is required to develop "the maximum volume of potential sales of the company's products" in his trade area and "to promote in dealer's trade area, in every reasonable manner to the satisfaction of company at dealer's expense the sales of company products". This clearly establishes his first obligation to promote Massey-Ferguson products.

To compete in each local area, MF must have a dealer who provides adequate representation of the sale of MF products at retail. This representation not only benefits the company but the dealer as well. If the dealer does not achieve such representation, the company has the right to terminate the dealer sales agreement in accordance with the provisions of paragraph 5.

There are sound reasons for this policy of adequate representation. First, MF believes it produces quality products which must be retailed by dealers who share the company's enthusiasm for these products. Secondly, Massey-

Ferguson, as will be described in chapter X, offers what it considers attractive financing arrangements to its dealers and to their customers. Thirdly, Massey-Ferguson, as described earlier in this chapter, devotes considerable time and expense to reviewing, appraising and assisting the dealer in the expectation that his operations will improve to the mutual advantage of the dealer and the company.

If the dealer represents a short-line company or some company with less generous credit terms, he is tempted to pay those shorter term obligations with cash earned from his long-line MF sales which account for most of his business. In time, he might find difficulty meeting his MF obligations. Furthermore, if the dealer starts handling competitive lines, he is also obligated to incur the financial burden of carrying competitive parts inventories, often on short-term credit. This, too, can erode his working capital, reduce his liquidity and lead to difficulty in repaying his major suppliers.

Nevertheless, MF does not wish to prohibit the dealer from making his own informed decision to do business with other suppliers, regardless of the dangers inherent in this basic policy. MF believes that, on balance, this policy enhances the dealer's chances of success. Further, MF recognized that there may be "gaps" in its product lines, e.g., rod weeders --a machine MF does not make. The company recognizes that the dealer is serving his customers better if he can offer them such machines.

Dealership Terminations

Termination of the dealer sales agreement may be effected at any time by mutual consent, or upon 30-days written notice by the dealer, or by 90-days written notice by the company. However, the agreement terminates immediately, automatically and without notice upon attempted assignment of the agreement by the dealer, upon commencement of any occurrance connected with dissolution or liquidation of the dealer, if the dealer commits any act of bankruptcy, or upon the death of a dealer or of a partner.

Immediate termination with notice occurs if the dealer breaches the agreement or upon a change of direct or indirect ownership or management of the dealership without the prior consent of the company.

The results of termination are the same regardless of the reason for the termination. Unshipped orders are cancelled without liability to either party or may require cash on delivery. All indebtedness to the company is immediately due and payable. The dealer removes all signs and discontinues use of Massey-Ferguson identification that might indicate he still holds the company franchise. The company may negotiate or consummate successor dealer arrangements prior to termination date, and neither party becomes liable for any damages to the other because of termination.

The Commission has heard that dealership terminations in some cases cause hardships. Under the MF sales agreement, the terminated dealer agrees to sell all salable new and unused machines, free of liens, etc., to the company and the company agrees to buy them with accessories and attachments at prices current in the machine price list less any discounts or reductions that have been allowed and less five percent.

The dealer also agrees to sell, and the company agrees to buy, free of emcumbrance all new and undamaged replacement parts listed in the current parts price list and left unsold at the dealer's place of business. The repurchase price of parts is the f.o.b. price charged to the dealer less a charge of 15 percent and less any discounts or reductions allowed to the dealer. Current undamaged, usable catalogues, price lists, service bulletins, owner's manuals, advertising and sales promotion material are similarly repurchased by the company. New machines, accessories and attachments are delivered to the company at the dealer's place of business, and the dealer is reimbursed for shipping costs incurred in making the original delivery to him.

Parts, catalogues, etc., and removable signs are packed or crated by the dealer and shipped to the nearest company branch at his expense, and the company reimburses the dealer for any parts freight costs incurred in shipment to him .

WARRANTY PROGRAM

New, unused Massey-Ferguson farm machinery is warranted to the purchaser by the dealer for 12 calendar months from the date of delivery to the purchaser to be free from defects in material or workmanship which may cause failure under normal usage and service when used for the purpose intended. In the event of failure of a part or parts, exclusive of batteries and other trade accessories and replacement parts, and if, upon inspection, the company is satisfied that failure is due to defective material or workmanship, when used for farm or agricultural purposes, such defective part or parts will be repaired or replaced at the dealer's price at the company's expense. Further, all repair or replacement parts are warranted for 90 days from the date of replacement or the unexpired 12-month period, whichever is longer.

For the farmer, this means that a problem occuring under the above conditions during the first year of ownership, will be rectified. Moreover, it is the company's desire that the rectification be accomplished with a minimum of inconvenience to the farmer.

A recent case in point involved one model of Massey-Ferguson tractor in 1966. On these tractors, power steering was standard equipment. Power for this steering feature was provided by an hydraulic pump supplied to the company as a complete component by another manufacturer. This supplier discovered that it had built 400 pumps for MF with inferior

material in the vanes. Material failure could cause the steering mechanism to lock, rendering the tractor useless and possibly endangering the driver. No field failures, however, had been reported to the company when the supplier notified Massey-Ferguson of the problem at 10 o'clock on a Friday morning.

Massey-Ferguson took immediate action. The supplier was able to identify the date of shipment of the faulty pumps. From this information and MF records, MF was able to identify the period during which it had installed this particular shipment of pumps. This led to a list of serial numbers of 1,400 tractors, any one of which might have had one of the 400 faulty pumps.

By noon, arrangements had been made with the supplier to provide rectification kits and to share the labor costs of installing them. MF prepared letters of explanation for the owners of the 1,400 tractors and teletypes for all Massey-Ferguson divisions and branches outlining the problem, providing the suspect serial numbers and instructing them to inform all their dealers of the serial numbers.

Dealers were asked to alert customers who had purchased a suspect tractor and request the customer not to operate it over five miles an hour. Dealers were also to hold any suspect tractors they still had in inventory and to check their records against the possibility they had transferred one to another dealer and its serial number might not appear in

his routine records.

All these communications were dispatched, and by 4 p.m. the company's five sales division headquarters and their 20 branches had the complete story and were notifying dealers. Before the day was over, dealers were telephoning owners of suspect tractors. Dealers followed up with letters in case the farmer had missed the phone call or did not fully understand the situation and the steps being taken to correct it. The emergency notification program continued through Saturday and Sunday. Within the interim from initial notification to rectification of the final tractors no serious incidents occurred.

The warranty, of course, protected the farmer financially. The communications MF set into motion within hours of initial notification safeguarded his physical wellbeing. This somewhat dramatic example illustrates the circumstances in which warranty and fast response are of prime importance. MF would, of course, follow the same procedure under similar circumstances regardless of the origin of the faulty part.

Warranties: How Long?

The Royal Commission has heard suggestions from certain earlier witnesses that farm machinery warranties should be similar to some automobile warranties, e.g., covering 5 years or 50,000 miles.

Massey-Ferguson submits that there are substantial differences in operating conditions and the basic purpose of the machines in question which must be recognized. Automobiles are generally passenger vehicles primarily intended for conveyance of a few hundred pounds of human or other cargo from point A to point B. Connecting points A and B, is likely to be a smooth concrete strip quite dissimilar to the terrain farm machinery must not only transverse, but must often transform.

The nature of normal highway vehicles, e.g., the automobile, is difficult to compare in any positive sense with that of self-propelled farm machinery. Difficult, because the assumed similarities, in MF's opinion, are largely superficial. It is simple, however, to summarize the basic similarities: normally both automobiles and self-propelled farm machinery are powered by internal combustion engines which burn some form of fossil fuel; and normally both move on wheels or some modifications of the wheel. The similarity, however, ends here.

It would, of course, be possible, at the risk of belaboring the obvious, to present an entire catalogue of dissimilarities between automobiles and combines or tractors, i.e., torque requirements, weights, types of engine design, etc., and between the conditions under which they operate.

When one considers the variety of conditions under which farm machinery must operate, and when one considers the variety of different mechanical and hydraulic systems which some farm machinery must employ, e.g., the

self-propelled combine, and when one further considers the extreme physical forces, e.g., stresses, strains and vibrations from rough terrain, repeated imposition of extreme loads, etc., one would expect that farm machinery could never be engineered to last as long as the passenger automobile.

The reverse, however, is true. MF farm machinery must be engineered and manufactured to last longer than the automobile. It is and it does.

There is a simple reason why: if it were not, it would not perform at all to expectation beyond a short initial period, i.e., long enough for it to tear itself apart on the forces imposed on it in the field. Stated differently, what extra is required in quality of design, strength and quality of materials, and quality of workmanship, to enable the machine to perform well in the field, corresponds to the critical difference between the shipwrecked sailor who swims a mile to shore and his shipmate who swims 5,200 feet.

MF builds its machines to ensure they make the full mile. And the full mile requires that the machines operate at top capacity for extended periods of time. <u>To run at top capacity over extended periods requires conscientious maintenance</u>. This maintenance might be viewed as the machine's equivalent of training for the athlete who also must perform at peak output for extended periods of time. It would be more convenient and less bother if machines did not need maintenance and if

athletes did not need physical conditioning; maintenance for machinery, at least, is necessary, if that machinery is to perform as advertised --a fact MF is continuously at pains to communicate to its dealers and their customers.

Automobile manufacturers feel the same way --a circumstance not so widely heralded as the existence of the so-called "extended" or 5-year/ 50,000-mile power-train warranty now common in the automobile industry. These warranties clearly establish the owner's responsibility for providing required maintenance services which must be certified.

One such warranty, during the first two years or 24,000 miles, covers the entire vehicle but only against defects of material or workmanship. This warranty does not and is not intended to cover the normal wear, deterioration and related maintenance that are certain to occur through use. It does not and is not intended to cover wear or failure caused by accident, neglect, abuse or misuse of the vehicle.

The same manufacturer's 5-year/50,000-mile power-train warranty warrants the following assemblies to be free from defects in material and workmanship under normal use and service for five years after delivery to the original purchaser or 50,000 miles of operation, whichever event occurs first, provided required maintenance services are performed and certified:

- engine block, head and all internal engine parts;
- water pump;
- intake manifold;
- transmission case and all internal transmission parts;
- torque converter;
- drive shaft;
- universal joints;
- rear axle and differential;
- suspension system (excluding shock absorbers);
- steering gear and linkage system;
- wheels and wheel bearings.

As a required condition to both the 24-month/24,000-mile and the 5-year/50,000-mile power-train warranty, the owner must have the following required maintenance services performed:

- engine oil changed every three months or 4,000 miles, whichever occurs first, and engine oil filter replaced every second oil change;

- carburetor air filter cleaned every six months and replaced every two years;
- in certain models, chassis grease fittings lubricated every 2,000 miles or three months, whichever comes first;
- once every six months, the owner must furnish an authorized dealer evidence that these required maintenance services have been performed at the proper intervals and have the dealer certify, on a form provided with the vehicle, (1) that the owner has furnished the dealer such evidence and (2) the vehicle's then current odometer mileage.

These warranties do not apply to any passenger car that has been subject to misuse, negligence or accident, nor to any passenger car that has been repaired or altered by other than an authorized dealer or service centre so as to adversely affect its performance and reliability, nor to any parts or servicing required as a result of using parts not sold or approved by the automobile manufacturer.

These warranties also do not apply to parts replacements, mechanical adjustments, repairs or other servicing normally made or required as

maintenance, such as replacing spark plugs, condenser, ignition points, brake and clutch linings, etc., or performing wheel alignments, wheel balancing, brake adjustments, engine tune-ups, cleaning fuel system, etc., or to normal deterioration of hoses, belts, upholstery,soft trim and appearance items due to wear and exposure.

Massey-Ferguson believes that any extension of its present warranty terms would first necessitate a thorough consideration of the potentially resultant greater administrative costs to the company, particularly in light of the greater per-unit administrative costs to a farm machinery manufacturer compared to an automobile manufacturer with its substantially greater unit sales. Extension of farm machinery warranty terms would also require a consideration of the differences between the divergent characteristics of automobiles and farm machinery, their respective function and operation.

It should be noted, in addition, that the manufacturer has the right and, indeed, the obligation to recommend or request owners to use suitable parts and lubrication that comply with stated specifications; if such recommendations or requests are not honored, and parts or lubrication possibly harmful to the machine --or none at all-- were used, the warranty could be voided.

Since it is economically infeasible for the company to test all "will-fit" parts and components of all suppliers in the market today for

quality and compatibility with MF machines, the owner who used such parts or components could have his warranty cancelled if such use adversely affected the operation of the machine. Indeed, this caution is included in the retail warranty given to the farmer when he buys new MF machinery from his dealer.

MF believes in its warranty, both as a competitive factor and for the ease of mind it provides the farmer. The Company believes its present warranty adequately protects the interests of the three parties involved: the farmer, the dealer and the company.

In the short view, the MF warranty provides enough economic penalty that it is obviously to the company's interest to produce machinery which does not require warranty services; in the long view, the damage to the company's reputation in the market place --and the consequential long-term financial penalty that warranty implementation can cause-- is much more painful than the costs of the rectification in question.

It should be noted that MF warranty policy and terms are not static. The company is constantly reviewing and reassessing its warranties.

ASSISTANCE TO DEALERS

Farm machinery sales and service is a complex business. When one considers the 122 basically different machines in MF's Canadian line some

idea of the dealer's problems begins to emerge. Compound this with the almost infinite variety of operating conditions under which these machines must perform and one begins to appreciate how the farm machinery dealer's problems far exceed those, say, of an automobile dealer.

The company offers many forms of assistance to the dealer to help him control the complexity of his business and remove some of the causes of his problems. One example of this assistance is financial assistance explained in chapter X. Some others are treated below.

Business Management Training

This chapter has already dealt with business management training at some length and with the district manager's involvement with it. To back up the district manager in his counselling of the dealer and his staff, the company publishes a management manual. In loose-leaf hard covers, it is easily updated. This 336-page manual covers the areas of business management, new equipment sales management, used equipment management and merchandising, service management and personnel management.

The business management section, for example, discusses accounting principles, under 15 headings, and how to apply them. It stresses their significance, provides illustrated examples and offers a simple, uniform Massey-Ferguson dealer accounting system. It discusses the financial statement, its significance and its development under 36 headings.

It discusses management planning under 10 headings, and expense planning under 26 headings.

The entire manual is prepared with a minimum of words. It does not deal in theory or history. It is a simple, practical book, written in simple language that can be understood readily by a relatively unschooled dealer and, at the same time, look like straight common sense to a well-educated dealer.

Product and Service Training

As indicated elsewhere in this brief, the company provides a variety of assistance of this nature. In general, it falls into the following categories:

- product sales training through formal course attendance;
- product sales training through local seminars;
- product sales assistance through advertising, sales promotion, product information manuals and newsletters, parts merchandising programs and publications provided customers and potential customers;
- product service training through attendance at the North American Training Centre;

- product service training presented locally;

- product service training through published technical maintenance guidance prepared for every machine;

- product service advice and assistance from the branch or regional service manager;

- product sales advice and assistance from the district manager and the regional sales manager.

Product training school: the company maintains the North American Training Centre located at Indianapolis, Indiana. The centre, among other instruction, offers courses for dealers' salesmen which teach them how to demonstrate MF farm machinery. Students receive thorough instruction in user benefits of the machines. This helps enable the dealer and his sales staff to provide advice to customers --so that the machine purchased will match the farmer's requirements. These courses teach proper use and stress proper maintenance to help ensure low operating expense and continuing, dependable operation. They also stress proper operating technique to ensure the safety of the operator.

Product field training: this is local training which describes MF machines and their applications to ensure that sales personnel sell the correct machine for the job. Through this training, dealership sales

personnel are instructed in the design, intended application and in the proper and safe operation of MF machines. This instruction prepares them to counsel farmers in the selection of machines best suited to their needs.

Additional Sales Assistance: this category of assistance includes many activities. Advertising, of course, is probably the predominate sales aid. This will be discussed later in this chapter with respect to its importance in bringing significant product information to the potential customer.

Sales promotion takes many forms from special demonstrations, to local support of seasonal programs which offer discounts to the farmer for ordering early, to the stimulation of dealer enthusiasm in connection with the introduction of improved farm machinery. Sales promotion often involves working closely with the dealer. MF believes that dealers benefit from the company's sales promotion programs to the extent they participate in the dealer-participation programs and universally from non-participative programs.

Product information manuals are important selling aids to the dealer. Their importance stems from the fact that they contain the information that the farmer needs to make his purchasing decision. The dealer uses them to explain the machine to the potential customer and relate the machine to his needs. The product information manual also tells him

how to display and demonstrate it. This manual is not supplied to the customer with his new machine, for if he purchases the machine described in the book, he no longer needs the book; the book has already served its purpose in making the connection in the buyer's mind between the machine's capabilities and his own farming requirements. To this end, dealers often attach a copy to the showroom machine and let the farmer "sell" himself.

The dealer sometimes finds himself at a disadvantage if selling to a farmer who expresses interest in a competitive machine. The dealer sometimes simply does not know the advantages or disadvantages of competitive machines. Therefore, from time to time, the company issues a product newsletter for dealers which compares a competitive machine with the most similar MF machine.

These publications are of fundamental importance to the dealer. They bridge the gap between his local knowledge of his customers' requirements and the application of company products to them.

Another important sales aid to the dealer is the MF company-published newspaper, FARMING TODAY. It is published eight times a year and sent to 150,000 Canadian farmers, selected by MF dealers. It contains articles based on the experience of farmers with MF machines. This helps the farmer match the machine he buys against the work he has to do.

The newspaper also helps farmers with tips which may improve farm profit and articles on safety and on farming practices by farm authorities.

In addition, a company-financed magazine for MF dealers reports unusual ideas and techniques developed by individual MF dealers which improved their sales and service. Called TRIPLE TRIANGLE, it is published every other month.

Other programs of specific value to dealers with regard to parts merchandising are also offered. They are discussed in chapter VIII on replacement parts.

<u>Product service training</u>: the company's North American Training Centre instructs dealers' mechanics in the repair and overhaul of MF machines. More than 1,700 students attend each year.

The centre offers 23 formal courses for service mechanics. Of these, 17 concern agricultural machinery; the others deal with industrial and construction machines. Most of the courses last one or two days. Usually, the student comes to the centre for five days and elects the three or four courses he feels he needs the most. The company pays for the instruction; travel and lodging expenses are met by the mechanic or his employer.

The company has been experimenting with training centre extension courses. These have been developed by duplicating all visual materials used and transcribing the verbal course material to written form. These courses, offered through all MF Canadian branches, have been well received.

Service manuals: on the staff of the North American Training Centre is a group of professional technical writers who prepare a variety of literature important to the dealer, his staff and their customers. One of the group's most important activities is preparation of technical maintenance guidance on each product.

The writers, who have practical backgrounds in agriculture and agricultural engineering, observe the machine in action, operate, disassemble and reassemble it themselves under the guidance of the centre's expert instructors. The manuals describe the best service techniques for major repair procedures. Parts are identified and the sequence of service operations is traced with both text and illustrations.

These manuals are produced for dealership service personnel, although customers may purchase them. MF believes, however, that the farmer, in general, is not properly prepared --even with the assistance of the technical service manual-- to perform the servicing these manuals describe. To perform critical repairs properly and minimize the risk of consequential damage from improper technique, requires professional

mechanics, preferably ones who have attended training centre courses (field maintenance, however, --which the farmer should perform -- is thoroughly covered in the operator's manual supplied with each new machine).

In addition to furnishing the dealer with this technical guidance, when a new machine is introduced MF requires dealers to acquire necessary new service tools and send service personnel to attend the company course of instruction relative to the new machine.

The technical maintenance guidance for all MF machinery is consolidated into five binder-type volumes which facilitate updating. Occasionally, a farmer will request and be furnished, at cost, the portions concerning a particular machine.

Other publications prepared for dealership service personnel include assembly and pre-delivery instructions. They tell dealership service personnel how to set up and adjust a machine before delivering it to the purchaser.

Facilities planning: the marketing department's retail development staff has researched ideal physical facilities for MF dealerships of different sizes. Its studies have led to the recommendations shown on the following page. Architects were retained to prepare building plans based on the needs of the size dealerships shown. The plans for each of the three

categories are so related that the small dealer can physically expand his facilities to accommodate a growing business volume.

MF-Suggested Dimensions for Dealership

	Dealership Volumes					
	Approximately $250,000		$250-550,000		$500,000-Plus	
Space Use	Square Feet	% of Total	Square Feet	% of Total	Square Feet	% of Total
Administration-Utility	232	4.2	1147	7.1	1147	5.8
Merchandise Area	1348	24.3	1234	7.6	1234	6.4
Parts Area	1320	23.8	2304	14.3	3456	17.6
Total Enclosed	1952	35.1	4307	26.7	5471	27.8
Area Main Building	4852	87.4	8992	55.7	11,308	57.6
Covered Display Area	726	12.6	2817	17.5	4006	20.4
Covered Assembly & Storage	0	0	2400	14.9	2400	12.2
Total Area Under Roof Main Building	5578	100.0	5217	32.4	6406	32.6
Paint-Pressure Cleaning Building	0	0	1920	11.9	1920	9.8
Total Area Under Roof All Buildings	5578	100.0	16129	100.0	19636	100.0

COMMUNICATIONS WITH THE AGRICULTURAL COMMUNITY

The Royal Commission has raised the question of communication of technical data from the company to the farmer. If one assumes a strict definition of "technical data", the MF position is that it does not communicate such information to farmers because it does not believe that such data are meaningful to the farmer in selection or maintenance of machinery in his farm environment.

The company, however, does recognize --and discharge-- many communications responsibilities with regard to farmers and most other segments of the agricultural community. In general, MF considers the entire information spectrum between (1) the sociological and economic importance of agriculture on a worldwide, national or regional level, and (2) beneficial "technical" information, which will not compromise the company competitively, to constitute its legitimate scope of communications with others in the agricultural community.

Some of these communications, e.g., tours of MF plants or farms, would normally be considered as "actions"; others are paid communications, i.e., advertising; still others are financial contributions. Stated differently, formal written communication is only one portion of a broad agricultural communication program. This program, for example, has for many years included substantial contributions to Canadian colleges, and universities for research, scholarships or other purposes.

Not all of this money is specified for support of studies relating to the traditionally recognized sub-branches of agriculture; for the company takes the viewpoint that other studies, e.g., econometrics, will eventually benefit the entire nation including the agricultural community.

Other MF contributions go to universities and other educational institutions, scholarships, hospitals and other health organizations, community services, and miscellaneous causes; and the same rationale applies: these contributions should eventually benefit the entire nation including the agricultural community.

Perhaps of greater significance in terms of more direct and immediate benefit to the agricultural community is the MF program of loaning or leasing farm machinery to agricultural colleges, universities or other institutions to familiarize future agricultural leaders with the company's products and to encourage agricultural research. The value of the machinery in these programs in Canada is substantial.

The company maintains these communications programs because it recognizes the importance to the agricultural community of the development, formalization and promulgation of new knowledge. Underlying this recognition is the company's awareness of the rapidly changing Canadian agricultural scene.

The company believes that this acceleration of rural change has many implications for itself and others in the agricultural community. For this reason MF is particularly pleased to note the scope of this Commission's inquiries and the Commission's numerous studies which should help answer questions which relate to or arise from fast-paced change in Canadian agriculture.

Many questions regarding Canadian agriculture are fraught with difficulties of definition not to mention their social, economic and political implications. Nevertheless, reasonable answers to these questions are as important to others in the agricultural community as they are to farmers. They are, in Massey-Ferguson's opinion, legitimate ground for dispassionate study.

Hopefully, the results of the Commission's studies --and other professionally conducted studies-- will be communicated to interested groups in the agricultural community whose need for such information is not matched by their ability to develop it themselves.

In such a way the total information available to the agricultural community would be enhanced far beyond the ability of the farm machinery industry to do so. This new information would be useful to the farm machinery industry in the planning required to meet its obligations in the market place as well as to other agricultural groups --and, indeed, to the government in the development of public policy.

AVAILABILITY OF "TECHNICAL" AND PRODUCT INFORMATION

The prospective customer has recourse to a number of sources of "technical" and product information in making his purchasing decisions. Most of such information results, directly or indirectly, through company efforts to provide the information.

The farmer's need for technical information does not cease when he purchases the machine; but the nature of the information he needs changes. Both categories of information, i.e., that of primary interest to prospective customers and that of primary interest to the customer after the purchase, are treated below.

Technical Information for Prospective Customers

This information flows through a number of channels, described below, usually with direct assistance from the company.

Commercial agricultural publications: personnel of the North American Training Centre and other company experts occasionally contribute technical assistance upon request to these farm and farm machinery publications.

The editors of these publications consider it their responsibility to report and evaluate agricultural mechanization advancements for the benefit and welfare of their readers. MF naturally cooperates with

these publications because the company believes they play a significant role in keeping farmers up-to-date and in assisting them in proper selection of machines.

Massey-Ferguson experts have, infrequently, prepared articles at the request of these publications. The following pages reproduce two articles on plowing and plow selection.

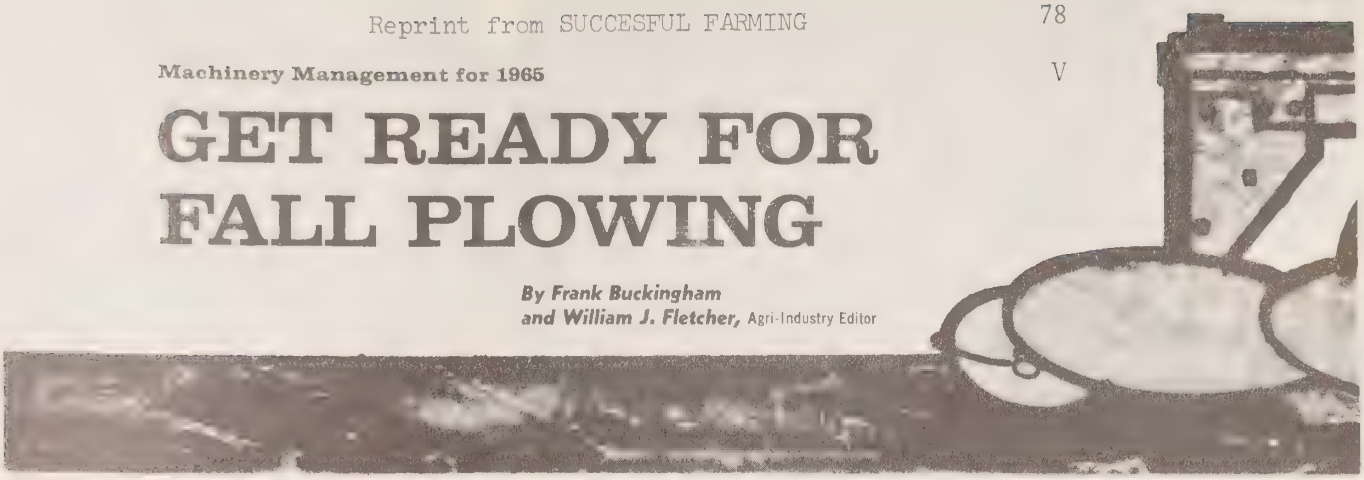
These articles, by-lined by company experts, are the exception in MF's communication of semi-technical data to the farmer or the dealer. The company believes that it should be the function of independent evaluators, be they agricultural journalists, engineers or scientists, to communicate what they believe is of prime significance to the farmer. These articles are also the exception because publications normally prefer or have their articles prepared by their own staffs. However, the company is always ready to provide any reasonable assistance these expert-evaluators may request.

The company makes a practice of providing each North American agricultural publication with its product information handbook, which contains a page of semi-technical data on each major MF machine. In addition, MF provides a new product information service to the agricultural press telling in straight-forward language about machinery the company is bringing to the market and what advantages MF believes such machinery offers the farmer. The following pages also reproduce a few samples of product information news releases from recent years.

Reprint from SUCCESFUL FARMING

Machinery Management for 1965

GET READY FOR FALL PLOWING



By Frank Buckingham
and William J. Fletcher, Agri-Industry Editor

Fall plowing is probably your biggest power job of the year and may take more of your time than any other single job you do. This is the time to make sure your tractor is tuned up and really ready to work.

Check engine timing or have your dealer's mechanic give the tractor a minor tune-up even though it may sound all right to you. Change spark plugs if they've been used all summer, even if they look good. Just a small saving in fuel consumption when that tractor is working hard all day long can add up to real money.

Your hydraulic system will also be getting a workout. If your tractor has a filter for the hydraulic system, check it and change if needed. Look for leaks.

You'll undoubtedly need added weight to get maximum drawbar pull for the hard fall plowing job. Fluid ballast and/or cast iron rear wheel weights are equally effective. Be sure to check the tire inflation for the weight the wheels will be carrying. If in doubt on tire inflation, check with your tire dealer.

There is no virtue in eliminating all slippage. Putting too much weight on your tractor wheels will increase power loss and may lead to a situation that can cause damage to the power train of the tractor.

Mounted and semi-mounted plows will transfer weight both from the plow and from the front end of the tractor to the rear wheels. You'll need to add only enough weight to the front end of the tractor to stabilize its steering, both while working and when turning.

The wheel tread width of your tractor will need to be adjusted to fit the plow you are pulling. Check the plow operator's manual for recommendation on this wheel spacing or use the formula in Figure 1.

Give your plow a once-over to see that it is ready to go to the field. For fall plowing, sharp shares are especially important. If you use disposable shares, consider taking off the partially worn ones and replacing them with new shares, saving the older ones for next spring when plowing conditions are much easier. Consider using narrow-cut shares for tough fall plowing as they do reduce draft.

If your plow is equipped with trip bottoms, check that each is free to function and isn't "frozen."

Give the plow a thorough lubrication before going to the field. If your plow is equipped with "packed" wheel bearings, now is the best time to renew this grease and check the condition of the bearings.

Hydraulic lines can deteriorate and couplers become worn over the years. Replace if there is any chance of failure in the field.

Pull-type plows

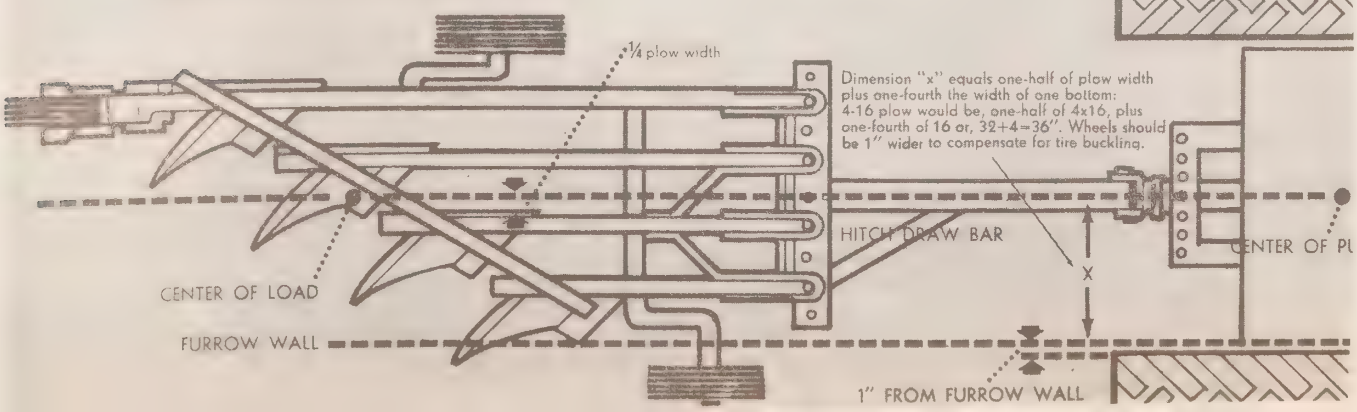
The objective in plow hookup is to align the center of load of the plow itself through the hitch in a straight line to the center of pull of the tractor. Figure 1 below shows a typical plow-tractor arrangement.

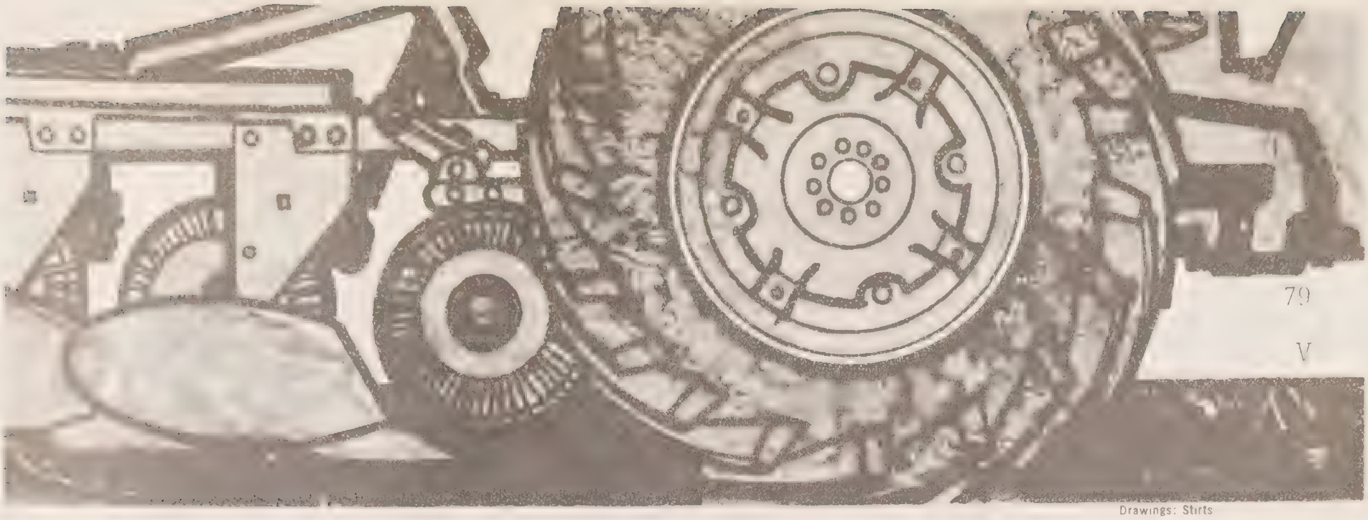
Fore and aft leveling of the tail wheel is the next adjustment to check. With the plow working in the ground, there should be room to place the end of your fingers under the bottom of the landside. If the landsides are leaving their mark on the bottom of the furrow, more weight of the plow should be carried on the tail wheel.

Semi-mounted plows

These plows are rapidly becoming the most popular

FIG. 1, PULL-TYPE PLOW





Drawings: Stirts

plow type because of their ability to effectively transfer extra weight to the tractor wheels, thereby providing the necessary traction for a wide variety of plowing conditions. A steerable tail wheel lets you make sharp turns on the corners and eliminates most of the problem of steering control while making turns because less weight has to be carried on the rear of the tractor. Figure 2 below shows the points at which adjustments can be made this type of plow.

The steering angle of the tail wheel should lead slightly away from the furrow wall in order to reduce the friction of the landsides. The fore and aft leveling is also accomplished at the tail wheel.

Fully mounted plows

In the smaller-size plows, the fully mounted version is usually less expensive per bottom, somewhat handier to use and can be used more efficiently than similar sized pull-type or semi-mounted plows.

Before hooking up for the field, review the operation of the hydraulic controls and become familiar with the "why" as well as the "how" so that you better understand the function of the system.

When hitching up your mounted plow, adjust the length of the upper (center) link to the manufacturer's recommendation. Minor adjustments may be needed later for leveling the plow fore and aft.

If the wheel setting of the tractor is adjusted to the distance specified for the plow, any minor changes in width of cut can be accomplished by rotating the cross shaft at the tractor hitch points. Depending on the plow type, this can be done with a bolt adjustment, crank, or hydraulic cylinder. This adjustment *should not* be used to compensate for incorrect wheel tread.

Too frequent changes in the plowing depth can be corrected by reducing the sensitivity of the response setting of the tractor hydraulic system. While plowing in the field, make sure the hydraulic controls are in the draft sensitive position rather than position control in order to take advantage of weight transfer.

General pointers

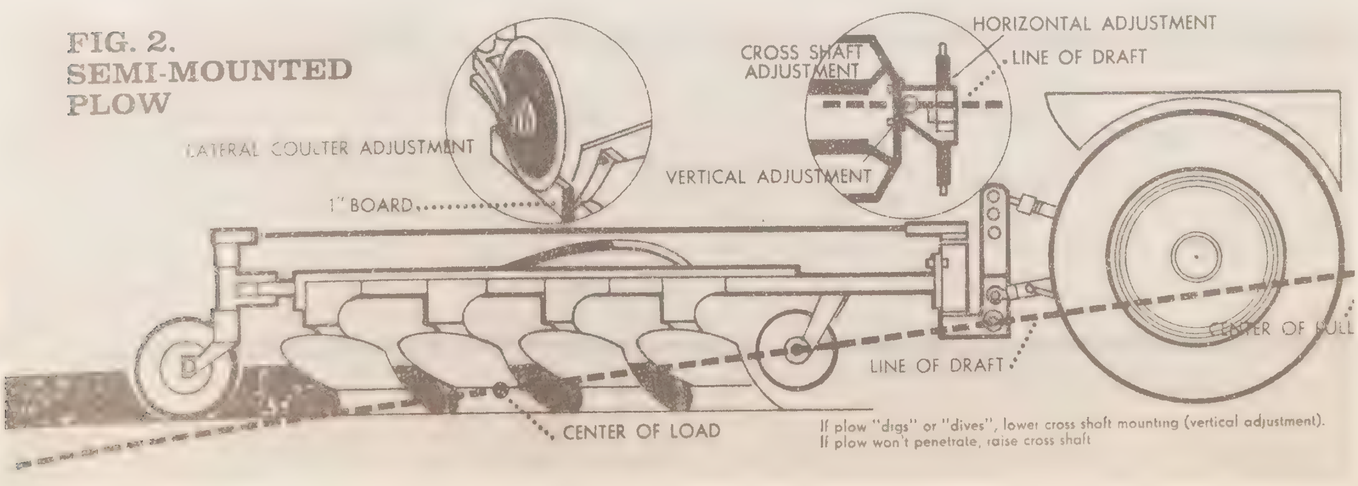
Coulters can be a problem in dry, hard fall plowing if not properly adjusted. They need to be just deep enough to cut surface trash and leave a smooth furrow wall. See Figure 2, for a simple way to check proper lateral coulter adjustment. Running too deep in hard ground can actually push the plow out of the ground.

If trash coverage devices aren't really needed for a good job, consider removing them to reduce plow draft. Just a few pounds of draft means wasted horsepower.

What about high-speed plowing? Unless you are bothered by rocks and other plowing obstacles, pulling a smaller plow at a higher speed results in fewer traction problems and less wear and tear on both plow and the tractor. However, the draft requirement will increase unless you have high-speed bottoms.

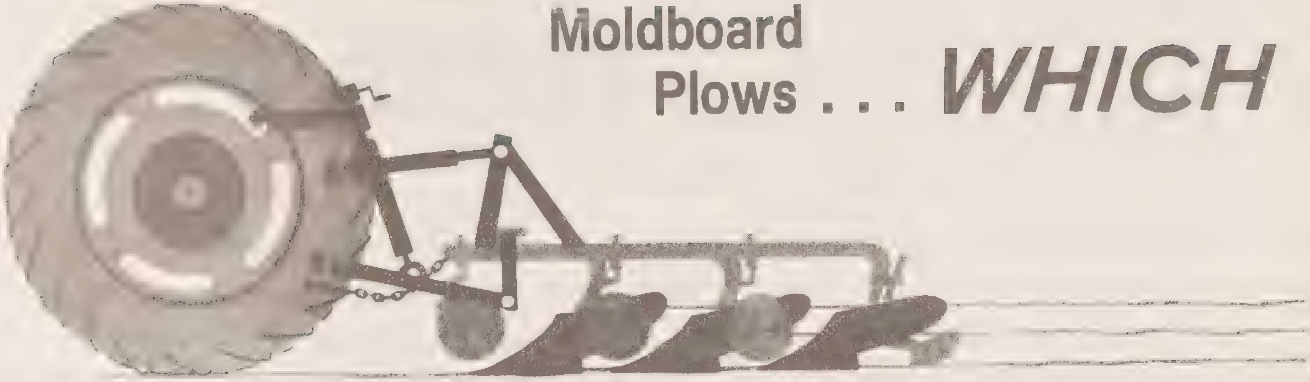
There is a definite practical limit to plowing speed, depending on the equipment and soil conditions. Many of the newer tractors are designed with a power-to-weight ratio which permits higher speed operation in the best power range of the tractor. This lets you do the same work in the same time with smaller, lower-priced tillage implements.

FIG. 2. SEMI-MOUNTED PLOW



If plow "digs" or "dives", lower cross shaft mounting (vertical adjustment). If plow won't penetrate, raise cross shaft

Selling Moldboard Plows . . . WHICH



By Frank Buckingham and Don Manson

The authors, pictured here and on the cover in the roles of prospect and dealer, are product training instructors for Massey-Ferguson at its Indianapolis facility. Buckingham (l.) is a former I&T staffer.

PART I

Complete understanding of the comparative advantages and limitations of the different plow types is a definite asset in selling plows. And since many plow sales are made in connection with the sale of a tractor, it is doubly important that the plow not only *match* the tractor, but that it also match the *conditions* under which it will be operated.

So let's consider, in this and another article, some of the ways in which the choice of plow type may be affected by the factors or considerations outlined in the accompanying table, which may be used as a general guide when comparing plow types. The factors in the table are not necessarily arranged in order of their importance, but each item should be considered when advising on the most desirable plow for a particular farm.

Acreage to Be Plowed

The size plow required to cover a given acreage will depend most on the time available for plowing; with weather, other farming operations, numbers and kinds of livestock to be cared for, and in some cases, harvesting of the previous crop on the land to be plowed, all competing for the same time period.

Where labor is expensive or scarce, a bigger plow will generally be more justifiable than where labor is cheap and plentiful.

Here's a rule of thumb for determining the acres which can be covered in a 10-hour day:

Multiply the plow's operating width in feet by the operating speed in miles per hour. Thus, a three bottom 16-inch plow (4 feet) operat-

Selecting Moldboard Plow Types — The Key Considerations

KINDS OF PLOWS	Tractor Size			Terrain		Irrigated Land	Soil Type	
	Large	Medium	Small	Rough	Level		Uniform	Changing
Tractor-Mounted	Good	Good	Good	Good	Good	Fair	Good	Good
Semi-Mounted	Good	Good	Poor	Good	Good	Fair	Good	Good
Pull Type	Good	Good	Poor	Fair	Good	Fair	Good	Good
Reversible (two-way)	Good	Good	Good	Good	Good	Excellent	Good	Good

TYPE IS BEST?

Despite recent developments in other methods of seedbed preparation, the moldboard plow remains the most widely used tillage implement. This 2-part review, aimed particularly at those whose plow-selling efforts have perhaps lapsed into order-taking, discusses the chief factors to consider in selecting one type of moldboard (mounted, semi-mounted, reversible, pull) over another.

ing at four miles per hour could be expected to cover approximately 16 acres per day. This figure assumes a reasonable number of stops for adjustments, unplugging, turning at the ends of the field, etc.

When determining plow size, don't overlook the possibility of an extremely wet season: Some farmers will insist on buying a plow big enough to do the job on time in the worst year they could expect for their particular area. This may often prove false economy, depending on the frequency of such severe weather, and whether or not the farmer can productively use the time saved in years of normal weather.

Large Tractors (6 Bottoms or More)

For efficient operation, plow size should match tractor size rather closely. Thus, crawler tractors and high-horsepower four-wheel drive tractors are limited almost completely to pull-type or specially designed mounted equipment. So we are discussing here wheel-type farm tractors now on the market, most of which can use mounted or semi-mounted plows, as well as pull-type equipment.

There are two main types of large wheel tractors available: (1) The standard type, used mostly in western areas for non-row-crop farming, which have standard wheel tread spacing and usually no provision for attachment of rear-mounted equipment; (2) row-crop tractors with adjustable wheel tread and generally two- or three-point linkage for rear-mounted implements.

Standard tractors usually have a hydraulic system for the operation of remote cylinders used to raise and lower pull-type equipment. Without rear linkage these tractors are limited to pull-type plows only, and due to their standard wheel spacing it may be impossible to obtain a straight line of draft from the plow to the tractor when running one wheel in the furrow. The tractor must then be driven either with both rear wheels on the land, or to off-hitch the plow to let the tractor wheel run in the furrow. Considerable side-draft may be encountered, however, in hard plowing if the hitch is offset very much.

Large row-crop tractors have adjustable wheels, and in most cases, a two- or three-point hitch which provides draft control and weight transfer for rear-mounted implements. Pull-type plows can be used with these tractors and, since the wheel tread is adjustable, a straight

Field Size, Shape: Small, Irregular	Field Size, Shape: Large, Rectangular	Field Size, Shape: Acreage to be Plowed	Operating Factors: Average Operator	Operating Factors: Poor Operator	Operating Factors: Ease of Adjustment	Operating Factors: Frequency of Adjustment	Price per Bottom	Maneuverability	Kind, Amount of Trash (clearance)
Good	Good	Small-Medium	Good	Poor	Easiest	Most Often	Lowest	Best	Fair
Fair	Good	Medium-Large	Good	Fair	Good	Moderate	Next Lowest	3rd Best	Good
Poor	Good	Large	Good	Good	Fair	Least	Next Highest	4th Best	Good
Fair-Good	Good	Small-Medium	Good	Poor	Fair	Moderate	Highest	2nd Best	Good

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V

PLOWS

Which is best?

line of pull can be maintained in many cases with up to six-bottom plows with the tractor wheel in the furrow. But with most large tractors with six-bottom or larger plows it will be necessary either to drive with both rear wheels on the land, or to offset the hitch.

Tractor draft control cannot be used with pull-type plows, except for tractors equipped with a special weight transfer hitch for pull-type equipment. These hitches are coupled to the tractor draft control system and are rigid horizontally. Thus the tractor attempts to lift the entire plow, which transfers weight to the tractor rear wheels and increases traction.

Draft control, with semi-mounted or mounted plows, will keep the tractor under steady load, but will also cause some variations in plowing depth as harder or softer spots are encountered. Extent of depth change will depend on how extreme the soil differences are. Large changes in plowing depth may be corrected by the operator if a constant depth is desired.

With draft control maintaining a constant load on the tractor engine, and weight transfer from the plow increasing traction, the tractor is better able to pull through hard spots in the field without overloading the engine or changing gears.

Mounted plows on the large tractors take full advantage of the draft control and weight transfer features of the tractor hitches. But added weight of large mounted plows may cause the tractor's front end to become unstable when turning or in transport unless it is adequately weighted.

Front weights are not a total disadvantage, since the tractor weight transfer system takes a portion of the weight from the front tractor wheels as well as from the plow.

Adding more weight to the front end than is required for stability and steering will only increase rolling resistance of the front wheels and will not provide additional weight transfer or traction.

Medium Tractors (4-5 Bottoms)

Most current medium size tractors are available with either two- or three-point hitches which provide some method of draft control and weight transfer. Most of them also have adjustable wheels, which can thus be set to obtain the proper line of draft from the plow.

All plow types will perform satisfactorily with these tractors. But since most pull-type plows cannot use draft control and weight transfer hitches, they must generally be purchased in smaller sizes or operated at slower speeds than mounted or semi-mounted plows. Also, more additional weight must be used on tractor rear wheels when operating pull-type plows.

Since semi-mounted and mounted plows can take advantage of the tractor draft control system they can generally be operated faster in the same soil conditions, or sometimes with additional bottoms, compared to pull-type plows.

Mounted plows become essentially self-propelled implements, which adds to the ease of handling. But enough front-end weight is needed for tractor stability.

Small Tractors (2-3 Bottoms)

Most current small tractors are equipped with hitches offering some means of draft control and weight transfer, so the mounted plow is usually best for these tractors; draft control and weight transfer permit use of larger plows than would be possible with pull-type equipment, and the mounted plow-tractor combination is the most maneuverable.

Maneuverability

Mounted plows generally maneuver better than pull-type or semi-mounted plows since they are usually shorter per bottom and can turn directly with the tractor. The plow can go anywhere the tractor can—forward or reverse. However, with larger mounted plows, and to some

(Continued on page 38)

Defining Plow Types

Mounted: Attached to tractor rear linkage, carried solely by the tractor when in the transport position.

Reversible: Equipped with two sets of moldboards to throw all furrows in the same direction. May be tractor-mounted or pull type.

Semi-Mounted: Attached to the tractor rear linkage but supported in the rear by transport wheel (which serves also as furrow wheel). Semi-mounted plows may pivot over cross shaft attached to tractor lower links and have steerable tail wheel, or have fixed cross shaft and freely pivoting tail wheel, in which case the plow always remains in line with the tractor.

Pull-Type: Equipped with their own transport wheels; not raised or lowered by the tractor linkage. Remote hydraulic cylinder normally raises and lowers these units.

Selling Moldboard Plows

Starts on page 22

extent with small and medium size mounted plows, care must be taken to avoid striking fences, etc., when turning at headlands, around corners, etc.

Semi-mounted plows can turn almost as short as mounted plows, and generally shorter than pull-type plows. And with the pivoting, or steerable, tail wheel the semi-mounted plow can be backed into fence corners, buildings, etc., almost as easily as mounted units.

Level Terrain

All plow types will perform satisfactorily on level terrain, assuming adequate field size in which close maneuvering is not a critical factor.

Rough Terrain

Pull-type plows provide good flexibility in crossing waterways and ditches, but can be somewhat awkward on contours or point rows. Obtaining adequate traction also becomes more of a problem when plowing hillsides, and additional rear wheel weights will usually have to be added for pull-type plows.

Semi-mounted plows offer good flexibility, as well as maneuverability for plowing contours or point rows. Tractor stability is very good.

Mounted plows combine weight transfer, draft control and maneuverability — all important features when plowing hillsides and irregular fields. However, steep slopes and sharp turns reduce tractor stability; thus, the tractor front end requires adequate weighting with mounted plows.

Mounted reversible plows work well for plowing contours, terraces, point rows, etc., since they leave only one dead furrow at the edge of the field. Pull-type reversible plows are slightly less desirable for this kind of plowing, since they lack the maneuverability of mounted units.

(The April 7 I&T will take up further considerations in plow selection—Irrigated land, uniform soil type, frequently changing soil types, large rectangular fields, small, irregular fields, kinds and amounts of trash, ease of adjustment, frequency of adjustments, operator skills and preferences and price per bottom.)

Mounted, Semi-Mounted, Pull-Type or Reversible?

SELECTING THE RIGHT MOLDBOARD, PART II

How well do you understand the plus and minus aspects of the different plow types as they apply to different situations? Does the plow match the tractor?—And does it match plowing conditions to be faced?

By Frank Buckingham, Product Specialist
and Don Manson, Product Training Instructor | MASSEY-FERGUSON, INC.

The first article in this series (March 21) covered such plow selection factors as: Number of acres; use with large, medium and small tractors; maneuverability; and level and rough terrain. Here are further considerations: Irrigated land; changing and uniform soil types; large, regular vs. small, irregular fields; trash; ease and frequency of adjustments; operator skills and preferences; and price per bottom.

Irrigated Land

Since irrigated land must be as level as possible, the reversible plow is the most desirable on such acres. Leveling the single dead furrow at the edge of the field poses no special problem, compared to the numerous dead furrows commonly left by other plows.

Uniform Soil Type

Any of the plows may be expected to perform well when properly adjusted and operated in fields of uniform soil type; field adjustments are virtually eliminated and the plow requires little operator attention.

Frequently Changing Soil Types

A properly adjusted pull-type unit will plow at essentially the same depth when going from one soil type to another if the soils are firm enough to hold up the wheels. Farmers who insist on uniform plowing depth, but with frequently changing soil types within their fields, should probably have a pull-type plow.

Mounted and semi-mounted plows operating off the tractor draft control system will change plowing depth in relation to degree of difference in soil types, the amount of change depending upon the difference in draft on the plow and responsiveness of the draft control system. Use of draft control also reduces engine overloading and gear shifting.

Large Rectangular Fields

Any of the plow types perform all right in large, relatively flat fields; final choice depends on total acreage, tractor size, etc.

Small Irregular Fields

A small to medium mounted plow is usually best for use in small irregularly shaped fields. They can get into corners and make shorter turns than the other types. Pull-type plows are the least desirable for this work; they require more turning space, frequently on plowed ground, and also more time.

Kind and Amount of Trash

Semi-mounted and pull-type plows can usually be built longer than mounted plows without sacrificing control and operating efficiency of the tractor. They therefore normally have better trash clearance. More trash clearance is also available on the same model plows with 16-inch bottoms than on those with 14-inch bottoms.

Properly adjusted rolling coulters, trash covers, weed hooks or covering wires can greatly improve the quality of plowing and reduce lost time from trash plugging. Coulters should be set just deep enough to cut surface trash, usually about one-fourth the diameter of the coulter. Setting coulters too deep may cause the plow to ride on the coulter hub, causing excessive wear and preventing the plow from reaching its proper depth. In extremely hard soils coulters should be set directly above or to the rear of the share point to prevent the plow from riding out of the ground on the coulters.

Coulters should be set far enough outside the landside (half to three-fourths of an inch) to leave a

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Plow Types

Reversible: Equipped with two sets of moldboards to throw all furrows in the same direction. May be tractor-mounted or pull type.

Pull-Type: Equipped with their own transport wheels; not raised or lowered by the tractor linkage. Remote hydraulic cylinder normally raises and lowers these units.

Mounted: Attached to tractor rear linkage, carried solely by the tractor when in the transport position.

Semi-Mounted: Attached to the tractor rear linkage but supported in the rear by transport wheel (which serves also as furrow wheel). Semi-mounted plows may pivot over cross shaft attached to tractor lower links and have steerable tail wheel, or have fixed cross shaft and freely pivoting tail wheel, in which case the plow remains in line with the tractor.

straight furrow wall. Setting coulters too wide will cause the bottom to cut too wide and increase draft. Setting the coulter inside the landside will cause excessive wear on the shin of the moldboard and leave a ragged furrow wall.

Trash covers and jointers should be set to roll a thin ribbon of soil from the top corner of the furrow slice into the bottom of the furrow, thus providing extra loose dirt for trash coverage and rolling under trash on the edge of the furrow slice. For more complete trash coverage or better scouring, the wing of the jointer or trash cover is set forward; for less coverage, or to reduce unnecessary draft, the wing is moved rearward.

Ease of Adjustment

Plowing depth may be increased or decreased from the tractor seat with mounted or semi-mounted plows. Plowing depth of pull-type plows with remote hydraulic cylinder lift may be decreased from the tractor seat, but the change is not permanent; the plow will not return to the new depth automatically after raising and lowering again at the end.

Some remote hydraulic cylinders may be "inched" slightly deeper than their normal operating position after the plow has been lowered to its preset level. Again, this new level is not regained automatically after the plow has been raised and lowered.

Lateral leveling of most mounted and semi-mounted plows is adjusted from the tractor seat by means of the leveling crank on the tractor lower lift links.

Many mounted plows are equipped with a hand crank, lever or hydraulic cylinder attachment for rotating the plow cross-shaft. This increases or decreases the width of cut of the front bottom. If the front bottom does not cut a full furrow it will not throw enough soil to level the plowed ground; if it is cutting too wide it may leave a ridge and increase side-draft, strain and wear on the plow.

Changing depth of reversible plows may be done from the tractor seat, but most other adjustments on these plows must be done from the ground. *Proper* adjustment of the reversible plow is even more important than with any of the other plows, in that a "correction" applied when plowing in one direction may simply double the problem when the plow is reversed.

Frequency of Operating Adjustments

After initial working adjustments are made, a pull-type plow will normally continue to function properly without further changes, barring extreme variations in soil type. Mounted plows, especially in varying soil types, will require frequent changes. However, these changes may be made without stopping the tractor and require little effort.

Semi-mounted plows fall between pull-type and mounted plows in regard to adjustment frequency.

Average Operator

An operator who knows and understands the functions of the various controls on both tractor and plow, and who will make the necessary adjustment as needed, normally can do a satisfactory job of plowing with any of the plow types. Under adverse conditions, greater skill and understanding of the effect of each adjustment on the plowing job is required for good results.

Poor Operator

With unskilled operators, many farmers prefer to use pull-type plows. As noted before, the pull-type plow may be adjusted on entering the field and expected to function satisfactorily for some time without further attention.

Operator Preference

With all these practical considerations, each farmer usually has a personal preference as to which type plow he would rather operate. In some cases, no amount of "selling" can force him to change his mind. Such preferences, or notions, also frequently apply to the size plow necessary for a particular operation.

So is it better to make a sale of a machine which is not suited to the application or to let the customer buy somewhere else the plow *he* thinks he needs? Fortunately, few customers fall in this category.

The salesman who is thoroughly familiar with his equipment, and who convinces the customer he knows what he is talking about, will not be greatly troubled by this type of customer.

Price-per-Bottom

In general, because of the extra set of bottoms, the price per bottom of reversible plows will be higher than any of the other types on the basis of effective bottoms. Second in price-per-bottom is normally the pull-type unit (there is the extra cost of the wheels and axles). Eliminating the front wheels reduces the price on a semi-mounted plow, but the lowest priced per bottom is the fully mounted plow, with fewer parts and shorter overall length.

Summary

Most farmers have pretty well decided what type and size plow they want before they start "shopping" for a new plow. But most will listen to suggestions regarding the possible selection of a different type or size plow if they believe the salesman knows his wares. Convincing him of this is best done with an on-farm demonstration.

But a poor demonstration may be worse than no showing at all. Therefore, before demonstrating a plow, be sure it is properly adjusted, have the moldboards scoured before the demonstration if possible, be sure the tractor is operating properly, that tractor wheels are adjusted correctly and that adequate weights have been installed.

Public Relations Department
Massey-Ferguson Industries Limited
915 King Street West, Toronto 3. Tel: 366-6911

RELEASE DATE: JANUARY 15, 1965

IMPORTANT NOTE TO EDITORS: While this product material is being provided to you AT THIS ADVANCE DATE to enable you to meet your publication's normal closing date, the material is not released for publication before January 15, 1965. We fully appreciate your technical and ethical problems but ask that you respect our product information release date.

Toronto, Jan. 15 - A new hay-baler from Massey-Ferguson Industries Limited is the medium-sized MF 9, unveiled today at Mexico City at a special showing of a new line of tractors and implements for MF's North American dealers.

The MF 9 is designed for the family farm. Its special feature is a wide, 56-inch pickup which can feed wide windrows into an improved cross-feed for rapid, efficient baling.

Like all MF harvesting and haying equipment, the MF 9 needs only seasonal lubrication. Give it the grease gun early in the spring, and the MF 9 will work non-stop throughout the haying season when every hour counts.

A new hitch and two-joint PTO make the MF 9 easy to handle. A dial hitching system works with a strong two-joint short-coupled PTO.

Haying is virtually automated when the MF 9 works with the MF 21 bale thrower. The MF 21 attaches easily behind the MF 9 to muscle freshly bound bales into the wagon. Together the MF 9 and the MF 21 make haying a one-man operation.

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Toronto, Jan. 15 - Mechanical muscle makes haying an automated one-man operation when the MF 21 bale thrower is teamed with the new family of balers from Massey-Ferguson Industries Limited.

The MF 21, first introduced to North American farmers in 1962, has been redesigned to handle the extra output of MF's new wide-pickup MF 9 baler.

They were unveiled today in Mexico City at a special showing for company dealers from all parts of North America.

The MF 21 comes equipped with PTO. PTO conversion kits will be available for farmers now using engine models.

Special features of the new MF 21 include a variable speed control, operated from the tractor seat. High-speed bearings are life lubricated, and self-aligning.

The MF 21 attaches to the baler with sturdy brackets, forming, with the baler, a two-unit power train PTO hookup. A wagon tows along behind to catch bales up to 36 inches long and weighing up to 75 pounds.

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Public Relations Department

Massey-Ferguson Industries Limited

915 King Street West, Toronto 3. Tel: 366-6911

FOR IMMEDIATE RELEASE

Toronto, May 10 -- Massey-Ferguson Industries Limited has added a giant to its line of tillage tools for use with tractors in the more-than-100 horsepower class.

It is the MF 52 tandem wheeled 21-foot disc harrow, which has undergone some of the most extreme tests to prove its ruggedness in hard soil conditions or in tilling virgin farm fields.

An important feature of the 21-foot MF 52 is its flexibility for transport. The hinge at the winged extension has been designed to permit the extension to be raised and easily locked into position for transport on dual wheels. The tubular frame has sealed-for-life ball bearings, with additional bracing and attachment points for the extension.

Scrapers are included as standard equipment on this harrow, which has a 120-inch motion bar to give greater stability on rolling land and more uniform penetration across the width of the disc.

Cutting width of the 21-foot MF 52 is 20 feet 8 inches with 7-3/8" spacing and 20 feet 7 inches with 9-1/4" spacing.

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The 21-foot MF 52 comes with standard hitch but has the optional feature of MF's exclusive Advanced Ferguson System with Pressure Control hitch, which transfers weight of pull-type implements to the tractor's rear wheels. This gives extra traction instantly and eliminates the bother and cost of using wheel weights. Also available as an attachment is a weight pan of special design which prevents an accumulation of trash and dirt in the pan.

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051065-74C

Public Relations Department
Massey-Ferguson Industries Limited
915 King Street West, Toronto 3. Tel 366-6911

FOR IMMEDIATE RELEASE

Toronto, July 7 - A stronger frame, no lubrication and easier mounting and detaching are among the features the farmer will find in two new cultivators offered by Massey-Ferguson Industries Limited, Toronto.

They are the MF 129 two-row cultivator and the MF 149 four-row cultivator which are available with a wide range of accessories and ground working tools. An adjustable shield attachment to prevent soil coverage of young plants is one unique feature.

Both cultivators have sweeps located well forward to give the operator a clear view of how close he is cultivating, even at high tractor speeds.

A "drive-in", "drive-out" swing frame enables the cultivators to be mounted or detached in minutes by one person.

There is no need for greasing because bearings are sealed in the gauge wheels and hillers. Also, pivot points are hardened to resist wear.

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Rubber-tired gauge wheels at the outer ends of the gangs maintain correct working depth in the MF 129 and MF 149 cultivators. A choice of regular or delayed action lifts is also available. Gangs are raised simultaneously with the regular lift; front and rear gangs can be raised independently with the delayed lift.

The two implements will cultivate crops on flat land, slopes, ridges or in furrow. They are ideal for cotton, corn and soybean cultivation.

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070765-88C

Public Relations Department
Massey-Ferguson Industries Limited
915 King Street West, Toronto 3. Tel: 366-6911

Toronto, July 15 -- Designed for medium-sized general purpose and dairy farms, the MF 130 tractor is a husky junior member of the new breed of tractors from Massey-Ferguson Industries Limited.

This versatile, compact model is built to be the most complete and modern tractor available in its power class. It can do any job on the farm from row-crop cultivation to plowing and haulage.

Powered by a 26.5 horsepower, four-cylinder Perkins diesel engine, it has eight-speed transmission with two synchronized speeds, disc brakes and a multiple function hydraulic system. Among its many features are a differential lock, adjustable track widths and a foam float seat to make long hours in the field seem easy. For convenient maintenance, the hood is hinged to the right to swing over completely, providing easy access to the engine. The radiator grille is also hinged.

The MF 130 incorporates many engineering advances. It has the Ferguson system for transferring weight from mounted

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implements and the resistance of the soil to the rear wheels. Draft control,position control and constant pumping are operated by one lever on a quadrant close to the operator.

Draft control is used to raise and lower ground engaging implements, and automatically sets their depth. Position control holds implements, such as post-hole diggers, at a pre-determined depth. Constant pumping provides the means of operating external equipment, such as front-mounted loaders.

071565-89C

Public Relations Department

Massey-Ferguson Industries Limited

915 King Street West, Toronto 3. Tel: 366-6911

FOR IMMEDIATE RELEASE

Toronto, July 19 -- Designed for summer fallow or seedbed preparation in wheat land or corn country, the new MF 125 chisel plow, being offered by Massey-Ferguson Industries Limited is a heavy-duty, pull type, high clearance machine. It can be varied in width from 10 to 26 feet by adding suitable extensions to the basic eight-foot frame.

The basic frame and two one-foot extensions form the minimum 10-foot width. Additional rigid extensions provide widths of 12 or 14 feet, and four-foot folding wings make the MF 125 a 16-foot unit. By combining four-foot or seven-foot wings and rigid extensions, the width can be increased in two-foot steps to a maximum of 26 feet.

Each wing has a rubber tired wheel to carry it during operations or turning. On 10-foot to 14-foot models, an eight-inch stroke hydraulic cylinder or hand ratchet is used for raising or lowering the plow. On 16-foot to 26-foot models, a 16-inch stroke cylinder is used. The same cylinder is used to fold the wings to the vertical transport position, and each wing can be lifted or lowered independently.

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Ground engaging tools include reversible spike or chisel points and 12, 14 or 16-inch sweeps. Vertical clearance is 26 inches. This chisel plow is compatible with a wide range of tractors, including the heaviest types.

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Public Relations Department
Massey-Ferguson Industries Limited
915 King Street West, Toronto 3. Tel. 366-6911

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FOR IMMEDIATE RELEASE

Toronto, July 27 -- Nine new or improved products have been added to the forage line of Massey-Ferguson Industries Limited to create the widest range of forage equipment this company has ever offered.

The latest addition is the MF 37 side-delivery rake, which allows high speed raking of hay, alfalfa and other forage from swath to windrow. It can be used on irrigation borders, terraces, headlands and other rough ground.

The MF 37 side-delivery rake can be operated with any tractor equipped with a drawbar for a single pin hitch; an exclusive knee-action wheel suspension absorbs shock. Off-set wheels, mounted close to the reel, allow the rake to follow ground contours and to rake more cleanly.

An advantage of the MF forage harvester, which provides choices of a pick-up head, or one-row crop head, is its versatility. Designed for large capacities, the MF 84 has

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a 113-square-inch throat. A crawler type top apron, which can be reversed to clear the throat opening, moves a compact, even flow of material to the cutter knives.

The MF 84 can also be adjusted for height to meet crop conditions and avoid hitting stones or scalping ridge rows. A four way deflector spout blows material where it is wanted. The shear bar is of tungsten carbide coated hard steel, and is reversible.

The MF 23 and MF 24 Forage Boxes -- among the largest available -- are identical except for length. The MF 23 has 600 cubic feet of forage capacity; the MF 24, 700 cubic feet. Features include a top side extension for easy removal to fill with a bucket loader. Beaters are staggered for even discharge. Large panels on the box prevent sway and warp. Both come in two or three-beater models.

The MF 7 and MF 8 running gears are for heavy loads. The MF 7 is rated at 14,000 pounds; MF 8 at 20,000 pounds. Designed not to sway or wobble at high speeds, both running gears have all-welded construction and can be equipped with used eight-ply passenger tires. Truck tires can also be used on the MF 8 running gear.

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The machine in the MF chopped forage line for all types of haylage and silage is the MF 88 crop blower with its two feed augers to give a positive hopper assist for sticky haylage. A direct drive and a nine-inch pipe enables this blower to lift heavy loads into silos as high as 80 feet. Feed throwout can easily be controlled by the operator on the ground.

Safety is considered in the design of the MF 89 silage distributor. This silage distributor does not require a man inside the silo. It is the only automatically ground-controlled machine to distribute tower silage both automatically and evenly. Powered by a 1/4 h.p. motor, it can be adapted to any blower with a nine-inch pipe.

Greater use of home grown feeds can be made with the MF 90 portable grinder-mixer, which allows the farmer to grind and mix at his convenience. Corrugated end plates and grinding concaves enable grinding to be done in the concave rather than on screens. The mix tank holds two tons and has six inspection windows. A spring loaded top prevents any damage from overfilling.

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Massey-Ferguson Industries Limited

915 King St. West, Toronto 3, Can

July 28, 1965

The enclosed product story and photographs are intended to answer basic questions about the MF 1100, the largest and most powerful tractor Massey-Ferguson Industries Limited has ever produced and placed on the market.

You may, however, wish to have additional details, or feature material on research, development, design, manufacture, quality control, customer use evaluation or other background information.

If so, or if you would prefer other types of photographs, please let me know what you have in mind. We will do everything possible to assist and co-operate with you in your news and editorial coverage of this "big power" tractor.

H. R. Redmond

H. R. Redmond,
Editorial Manager.

HRR:ghc

Public Relations Department
Massey-Ferguson Industries Limited
915 King Street West, Toronto 3. Tel: 366-6911

FOR IMMEDIATE RELEASE

Toronto, July 28 -- Massey-Ferguson Industries Limited has started production of tractors in the 100 horsepower class. Added now to the new line of MF tractors introduced earlier this year is the new MF 1100, a six-eight-plow, 8,000-pound giant.

The development of the MF 1100 illustrates the trend toward greater tractor power to increase farm productivity. This tractor's 354-cubic-inch Perkins diesel engine delivers 110 bare engine horsepower at 2,200 r.p.m., and an estimated 92 p.t.o. horsepower.

Twelve-speed multi-power transmission, adjustable steering wheel and hydrostatic power steering are standard features. Also standard are power disc brakes and flood-and-spot dual headlights. Every MF 1100 has a dry element air cleaner.

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The independent power-takeoff provides speeds of 540 or 1,000 r.p.m. The hydraulic system pumps 20 gallons a minute, and two remote hydraulic valves have couplers that can be connected and disconnected under pressure. There are choices of both four-wheel and dual tricycle row crop models, as well as the western model. It has the "rugged new breed" styling of all the new MF tractors.

Designed principally for corn, wheat, cotton and rice growing areas, the MF 1100 was under engineering development for six years. It has been farm tested, under a variety of soil and climatic conditions, for many months in an extensive customer use evaluation program.

On all models Pressure Control is an option. Pressure Control, introduced by Massey-Ferguson this year, extends the advantages of the Ferguson system of hydraulics and linkage to tractors with pull-type implements.

Previously the automatic transfer of weight from the front end, the implement and the soil resistance to the rear wheels could only be obtained with mounted implements. This weight transfer adds to traction and makes effective and economical use of engine power.

Besides numerous engineering refinements for high performance, the new tractor has many features to make the

more ...

operator's work safer, more convenient and more comfortable. The seat is power-adjusted. Hydraulic controls are in a console, gear shift levers are mounted in the dash, and there is an aircraft-type hand throttle, as well as a foot throttle. Electro-luminescent instrument panel lighting eliminates the need for bulb changing, and averts risk of instrument black-out.

The seven new MF tractors introduced this year range from the two-plow MF 130, with 26.5 horsepower, to this hefty new farm power plant. The MF 1100 is the most powerful tractor built by Massey-Ferguson ever offered.

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Public Relations Department

Massey-Ferguson Industries Limited

915 King Street West, Toronto 3. Tel: 367-3008

FOR IMMEDIATE RELEASE

Toronto, Sept. 22 -- Latest addition to Massey-Ferguson's family of self-propelled combines is a small machine with many features of larger MF combines. This MF 205 is designed for harvesting corn, soybeans, small grains and other seed crops. It can be equipped with a 10 or 13-foot grain table and a two-row wide or three-row narrow corn head.

The new combine has Massey-Ferguson's exclusive rethresher unit and many on-the-go control features of larger combines. It is the only combine of its size with a six cylinder engine, and its grain tank capacity of 54 bushels or 70 bushels with extensions is the largest in its class.

The rethresher unit makes it unnecessary to return tailings to the cylinder and concave for rethreshing or the straw walkers for separating. Overloading these units is avoided.

Platform mounted controls permit the operator, on-the-go, to adjust cylinder speed to match the crop, change the reel speed, reset the concave-cylinder clearance and operate the hydraulic reel lift. Even dumping the stone trap can be done on-the-go.

Cylinder width of the MF 205 is 26 inches, and separating area is 3,800 square inches.

Public Relations Department

Massey-Ferguson Industries Limited

915 King Street West, Toronto 3. Tel: 367-3008

FOR IMMEDIATE RELEASE

Toronto, February 17 -- A precision unit Planter, for accurate and fast planting of corn, soybeans, sorghum and other smooth seeds, has been announced by Massey-Ferguson Industries Limited.

This MF 41 unit Planter, mounted on a tool bar, accurately spaces seed from three to 14.5 inches apart in the row with units easily adjusted to any practical row spacing from 16 inches up. Rugged parallelogram linkage lets the Planter follow ground contours to ensure uniform planting depth, and double seed openers provide accurate seed placement under varying soil and moisture conditions.

Fast selection of seeds and an unusally short distance from the seed plate to the ground permits the MF 41 to plant accurately at speeds up to seven miles per hour. Full-bushel seed hoppers further speed up planting by cutting stops for refilling.

The new Planter has a wide range of planting rates and is capable of planting up to 68,000 plants per acre.

Attachments for the MF 41 include fertilizer, pesticide, minimum tillage and soil opening and closing units.

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Public Relations Department

Massey-Ferguson Industries Limited

915 King Street West, Toronto 3. Tel: 367-3008

FOR IMMEDIATE RELEASE

Toronto, June 30 -- The first plow in North America to combine the advantages of reversible and semi-mounted plows with a steerable tail wheel has been introduced by Massey-Ferguson Industries Limited.

This MF 59 Semi-Mounted Reversible Moldboard Plow eliminates dead and back furrows to leave a field level for maximum productivity. It also has the semi-mounted advantage of the plow's size being geared to the pulling power to today's more powerful tractors, instead of being limited by the tractor's ability to lift and carry as with fully mounted units.

In turning, the steerable tail wheel follows the tractor to permit short turns in either direction. It is possible to make direct turns, without looping or backing up, with headlands of only 25 to 30 feet in width. The turning linkage permits a 45-degree angle between the tractor and plow.

Available with 18-inch bottoms in four and five bottom sizes, the MF 59 is capable of plowing up to 16 inches deep. A 30-inch underbeam clearance and 34-inch fore-and-aft spacing provide extra trash clearance for deep plowing.

more...

Because of advance hitch design, the new plow allows tractors to operate on unplowed land instead of in the furrows. The results are increased traction, a reduction of plow sole compaction, a minimum angle of pull to the plow's center of load and greater operator comfort.

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<u>Cooperation in independent evaluations</u>: this cooperation takes several forms. Examples include MF's participation in the Nebraska tractor tests, the loaning or leasing of MF machines to colleges of agriculture and agricultural engineering, visits of staff members of such institutions to MF facilities where they observe manufacturing processes, testing procedures and the operation of the machinery under actual farming conditions.

These activities usually result in communication to selected agricultural groups conveying expert evaluation or comment. MF exercises no influence on the nature of that comment except through the quality of its machinery. MF cannot comment on the eventual effect of, or value to, the farmer of such communications in his machinery purchases.

<u>Professional papers by company experts</u>: occasionally, MF's own experts prepare technical or semi-technical papers which, for example, are submitted to various professional groups. Two examples follow. The first deals with "The Combine Corn Harvester and its Impact on Ontario Agriculture"; the second discusses certain MF practices in "Information Dissemination to Dealers and Farmers".

THE COMBINE CORN HARVESTER

AND ITS IMPACT ON ONTARIO AGRICULTURE

By

William G. Miller
Administrative Engineer

Massey Ferguson Industries Limited
Toronto, Ontario.

For Presentation at the
Congres des Igenieurs Canadiens 1967 Congress of Canadian Engineers

Montreal, Quebec.

This paper gives the background of the Combine Corn Harvester Development, its impact on agriculture, particularly in Ontario, also an examination of the Corn Head Attachment for the Combine Harvester, which has been one of the most significant factors in the changing agricultural scene.

1. INTRODUCTION

In the year 1492, when Columbus first landed on the shores of America, he found plantations of an edible grain crop growing within the confines of Indian villages. The natives called the plant "Mays" meaning "the sustainer of life". This was transliterated by the Spaniards into "Maiz" and later into the English language as "Maize".

At that time the common English word for grain crops was "corn". This applied to grain in general and especially to the common grain crop in any specific area. Thus the grain crop grown by the American Indians became known to the English colonists as "Indian Corn", and, when the hardy settlers discovered the value of this crop, it became literally the "sustainer of life" to them. When their wheat crop failed, the corn crop saved them from utter starvation. Ease of cultivation and the virtual certainty of a harvest made this grain very popular with the American homesteaders. It became the "Corn" of the American pioneer and has retained this title to this day.

2. THE PLACE OF CORN IN WORLD AGRICULTURE

Following wheat and rice, corn now ranks third among the grains for food and feed - i.e. for human consumption and as supplementary livestock ration. The United States Department of Agriculture issues each year Agricultural Statistics giving, among much other data, acreage and production for various crops by countries and continents. From this source the following statistics have been obtained.

WORLD ACREAGE COMPARED TO WHEAT AND RICE

YEAR	WHEAT	RICE	CORN
1950	426,510 1000 Acres / 6,320,000 1000 Bushels	234,767 1000 Acres / 7,454,582 1000 Bushels	212,340 1000 Acres / 5,210,000 1000 Bushels
1964	517,990 1000 Acres / 9,170,000 1000 Bushels	225,659 1000 Acres / 8,039,089 1000 Bushels	248,180 1000 Acres / 7,835,000 1000 Bushels

NOTE: Rice is taken at 45 lbs. per bushel

DISTRIBUTION OF WORLD PRODUCTION

In 1965 world production of corn increased by approximately 4.6% to a new high of 8.2 billion bushels, distributed as follows:

	Millions of Bushels	% of World Total
North and Central America	4,577	55.8
Western Europe	350	4.3
Eastern Europe	660	8.0
U.S.S.R.	190	2.3
Asia	1,055	12.9
Africa	550	6.7
South America	810	9.9
Australia and New Zealand	5	0.1
	8,197	100.0

Canadian acreage and production of grain corn as reported by the Dominion Bureau of Statistics is as follows:

		1947-51	1965
Canada	Acres	268,480	752,000
	Bushels(000)	12,710	59,648
Ontario	Acres	249,000	740,000
	Bushels(000)	12,383	59,348
Manitoba	Acres	19,480	12,000
	Bushels(000)	327	300

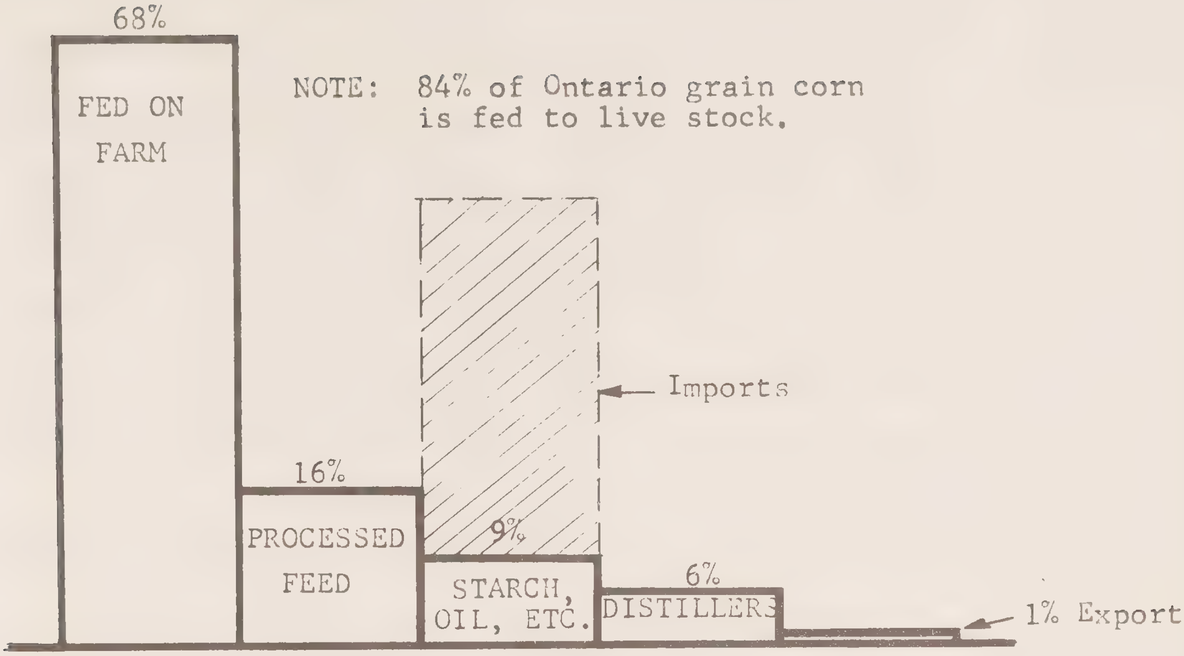
Almost the entire Canadian Grain Corn Crop has been produced in Ontario. A very small percentage (1.6%) has been grown in Manitoba. There are indications that production is now spreading to the province of Quebec, but the acreage and production has not been included in the latest crop census.

ONTARIO PERCENTAGE

In 1950 Ontario produced approximately 0.24% of the total world production. By 1965 this percentage had risen to 0.72%.

UTILIZATION OF GRAIN CORN

Ontario grown grain corn is basically used for livestock feed. 68% of home grown corn is fed on the farm. The remaining 32% is processed by industrial plants. Feed manufacturers take 16%, distillers take 6%, starch, brewers, breakfast food etc. take approximately 9% and roughly 1% is exported.



UTILIZATION OF ONTARIO GROWN CORN.

FIG. 1.

It should also be noted that corn imports, amounting to nearly 40% of home production, are used almost exclusively by starch and oil producers. This is a very definite area of potential expansion for corn production in Ontario.

3. THE PROBLEMS OF CORN PRODUCTION

THE SEED BED

Corn can be successfully produced on a wide variety of soils. The basic requirements are adequate drainage and soil fertility.

Methods of seed bed preparation have changed appreciably in the last few years. Prior to the advent of complete chemical weed control, it was necessary to do repeated tillage operations in order to destroy weed populations. The present trend to "minimum tillage" reduces the loss of organic matter and provides natural aeration and better erosion resistance. For good germination and growth, as far as the seed bed is concerned, it is only necessary that the soil be moist and firmed around the seed.

Some work has been done with "no tillage" systems. The land is not plowed, nor harrowed, it is merely slit to a depth sufficient to permit placing of the seed and is pressed back down again. This has given some very good results. One experimental plot has been planted in this way for 14 years and the soil remains in excellent condition due to the undisturbed bacterial and earth worm action.

THE SEED

The new, modern hybrids have been specifically developed for different climatic conditions. Corn belt hybrids, with a longer growing season, have more time for vegetative growth than those developed for Canadian conditions.

Reference should be made to the development by the Central Experimental Farm (in Ottawa) of Hybrids for short season areas and with early cold tolerance.

Of the 7,500 acres of certified seed grown in Ontario, this year, the majority is either Ottawa bred or contains elements of Ottawa breeds.

It is significant that the average yield in Ontario is about 10% higher than average U.S. yields. Of course yields in the U.S. Corn Belt are substantially higher than the U.S. average. It should also be added that maximum yields in Ontario are close to U.S. maximums. The basic problem in Hybrid development for Ontario conditions is to develop a plant with early maturity, cold tolerance in Spring, high yield and disease resistance. With the present trend toward much higher plant populations per acre, (from a present 18,000 plants to a possible 35,000) it is also important that the top leaves, in particular, of the corn be developed to achieve maximum photosynthesis. It should be noted that approximately 90% of the dry matter yield of a corn crop is derived from photosynthesis and only 10% from the soil.

For Ontario conditions, the selection of seed will be governed largely by the heat units required and available for corn production.

"Heat units" are arbitrary values based on relationships between corn development and temperature. They are calculated on the basis of temperatures above 50°F in daytime and 40°F at night. The sum of "heat units", between a derived planting date and the autumn date when killing frost can be expected one year in ten, is used to provide a heat unit rating for locations in Southern Ontario. (FIG.2) Grain corn can be grown in those areas having a rating of over 2,500 heat units. There are approximately 4 million acres of land suitable for grain corn growing in Ontario.

With present utilized acreage of only 800,000 acres, there is ample room for expansion.

CULTIVATION

Basically the only valid reason for row cultivation is to control weed growth; in most soils no useful purpose is served from the standpoint of moisture conservation. Where adequate weed control can be obtained by use of herbicides, mechanical weed removal is unnecessary and costly. In any event, cultivation should be quite shallow (less than 2" deep). Deeper cultivation damages the feeder roots and reduces crop yields.

HARVESTING

Harvesting of grain corn involves the removal of the ear from the plant, the removal of the husk from around the ear, and shelling, or separation of the kernels from the cob. These operations should be done when kernel moisture is between 25% and 30%. In the case of cribbed ear corn the shelling operation is done later, as and when required.

STORAGE AND SHIPMENT

Ear corn is usually stored in cribs and both the cob and the grain are used for feed. Cribs vary in size but are usually nine to 12 feet high.

Grain corn storage on the farm is becoming more important. This allows the farmer to eliminate waiting periods at elevators during the busy harvest season.

V

It also permits the grower to sell his production when the price is suitable. Many different forms of bulk grain storage are used, from old barns and converted corn cribs to plywood bins, steel bins, vertical concrete silos and rectangular single storey buildings. The single storey building is lower in cost than most other storage facilities and has the added advantage that it can be used for other purposes without major modification.

The rapid expansion, in both acreage and yield, in recent years has produced a marked trend toward field shelling rather than ear corn harvest. This, in turn, has necessarily demanded increased storage facilities both at the local elevators and on the farm.

On-the-farm storage of high-moisture shelled corn, or corn and cob meal has many advantages - such as

1. Low harvest losses
2. Convenience of handling
3. Low storage costs
4. Improved feed value (in some cases)

When the corn crop is not to be used on the farm where it is grown, it is generally desirable to reduce the moisture content from the 20% - 30% at harvest to from 13% - 15%. This is important to prevent rapid deterioration of the stored crop, to preserve its nutritive value and to assure germination for seed.

There are three basic methods of drying corn -

1. Natural Ventilation
2. Forced Natural Air
3. Forced Heated Air

The temperature of the drying air must not be too high. For example, it has been reported that corn heated to 180° - 200°F loses approximately 50% of its starch yield as compared to naturally dried corn. The feed market may accept corn dried at 180°F but the industrial market prefers corn dried by natural air to any heat dried material. They will accept as suitable corn dried at 130°F provided it meets the other standards and has a minimum of stress cracks. For seed corn the temperature must be held below 110°F to maintain germination. Air volumes in any case must be such that the shelled corn can be dried fast enough to prevent mold growth.

Moisture migration during storage for more than a few months can result in spoilage. A forced movement of air through the stored corn has been found of value in maintaining uniform moisture content in stored grain.

Some research in Europe and USA has pointed to the possibility of refrigerated or chilled storage of high moisture grains. At the 1966 Winter Meeting of the ASAE a paper was presented by Mr. Robert W. Frudeger entitled "For cold cash, you need cold corn". This outlined a new development in corn storage consisting of a dome-shaped insulated building made of aluminum, designed to store or

condition high moisture shelled corn at low temperatures and deriving its energy from an all electric heat pump. This building, with a 50,000 bushel capacity, is capable of accepting and chilling 10,000 bushels per day. V

4. HARVESTING PRACTICES IN ONTARIO THROUGH THE YEARS

(a) HAND HARVESTING

Up until the time of the first World War harvesting of corn in Ontario was mostly a manual operation. Picking corn, an ear at a time, by hand was not only one of the most gruelling jobs on the farm, it was also the most costly operation in growing the crop.

(b) THE CORN BINDER

With the introduction of the Corn Binder, the heavy manual work was greatly reduced but it was still necessary to stook the corn by hand and later haul it to the barn yard, for crib storage or for chopping into ensilage.

(c) THE CORN PICKER

The increasing industrial demand for shelled corn, and the increasing on-the-farm use as stock feed, led to the development first of the Corn Picker and later the Picker-Sheller. While the first important Corn Picker patent was allowed in 1880 and some one row Pickers - horse and tractor drawn - were sold in the United States during World War I, it was not until the development of the tractor-power-take-off that Corn Pickers really came into vogue.

The Corn Picker is essentially a tractor pulled or tractor mounted, 1 or 2 row unit designed to harvest only the ears, leaving the stalk and leaves in the field.

The basic elements of the Corn Picker are:

1. Long flexibly mounted "snouts" to run along the ground and lift up all fallen plants.
2. Gathering Chains to hold the stalk and feed it into the mechanism.
3. Snapping Rolls to pull the stalk down and snap off the ear.
4. Elevator to discharge ears into a trailed wagon.

Husking rolls, to remove the husk or green wrapper from around the ears, were added later thus converting the straight Corn-Picker into the Picker-Husker.

The development of the Picker-Sheller followed naturally, by the addition of a "sheller" unit between the husking rolls and the elevator,

The Picker-Sheller delivers shelled corn i.e. grain corn separated from the cob, into a trailed wagon from which it is unloaded into dryers and/or storage units either on the farm or at the local commercial elevator.

(d) <u>THE COMBINE CORN HARVESTER</u>

Concurrent with the development of Corn Harvesting machinery was the development of machinery for the harvesting of wheat and other cereal grains.

V

Beginning with the development of the horse drawn Reaper in the early 1830's, and the basic threshing principles about 5 years later, a constant progressive development has been going on.

The first steel thresher was introduced in 1904 and the pull type grain Combine or Reaper-Thresher in the 1920's.

The Self Propelled Combine was introduced into North America in 1938 and since that time has become standard equipment for big-acreage harvesting of small grains. The outstanding success of the Self-Propelled Combine led to the further developments of the same nature. Self Propelled Corn Pickers, Swathers, Windrowers and Hay Balers are some of the many applications of this principle.

One of the most outstanding developments in recent years has been the adaptation of Corn Picker units to the Self Propelled Grain Combine. This is known commercially as a Corn-Head-Attachment and, when mounted on the basic Self Propelled Combine, it constitutes an integrated machine, the Combine Corn Harvester, which removes the ears from the stalks, shells the corn - i.e. removes the kernels from the cobs - separates the kernels from the cobs and other debris and loads the kernels into a self contained tank, from which it can be unloaded on-the-go into trucks for hauling to drying units and/or permanent storage.

Two of the main advantages of the Combine Corn Harvester are that multiple rows can be harvested in one pass - up to 8 rows at the present time - and that the machine can continue harvesting while it is unloading into trucks.

The saving in total losses, harvesting costs and manpower, together with improved tillage methods and increased yields has improved the profitability of corn growing to such an extent that corn is now the highest-value-per-acre grain crop in Ontario. (FIG. 3 & 4)

There are approximately three to four million acres of land in the province of Ontario capable of producing corn. The acreage used for shelled corn has grown from less than 400,000 acres in 1961 to 752,000 acres in 1966. Combine Corn Harvesters were first sold in Ontario in 1960-61 and census figures indicate that there are now slightly over 900 of these machines in this province.

The increase in shelled-corn acreage in Ontario is related to, and has occurred simultaneously with, a corresponding increase in the use of Combine Corn Harvesters. There is every indication that both will continue to increase. (FIG. 5)

The ability to harvest larger acreages of corn within the optimum harvest period and the improved economics of the operation have encouraged this marked trend to larger acreages of corn. This has been accompanied by a trend to growing corn for "on the farm feed". This is a very healthy development representing a successful integration of livestock and crop production. Many poultry and swine producers, for example, are moving from all purchased feeds to the purchase of pre-mixes only, for mixing with home grown corn.

The improved position of the Ontario corn farmer will also permit him to compete with the U.S. corn producers and reduce the large importations of grain corn presently being brought in for feed and industrial use. Furthermore, at the present time, Ontario farmers continue to use substantial quantities of Western feed grain, most of which could be replaced by Ontario grown corn, if available at the right price.

5. <u>THE DEVELOPMENT OF THE COMBINE CORN HARVESTER</u>

(1) <u>THE OBJECTIVE</u>

(a) To combine in one integrated machine the functions of the Picker Sheller and the Self Propelled Grain Combine.

(b) To increase the machine capacity to four or more rows at a time.

(c) To reduce losses, particularly top and butt-shelling, experienced with Pickers and Picker-Shellers.

(2) <u>THE DIFFICULTIES</u>

(a) <u>Down Crop</u> - that is crop, weakened by insect damage or plant food deficiency, that has fallen over or has been knocked flat by wind or rain storm - must be picked up and harvested with a minimum loss. The problem is to lift the stalk, hold it more or less vertical, and guide it into the gathering chains and snapping rolls. This requires long, flexibly mounted snouts, suitably shaped and counter-balanced to present digging and yet able to pick up a stalk lying flat on the ground.

(b) Different row spacings

While row spacings are definitely becoming narrower, along with increasing plant population, at the present time, there is a wide variation from a maximum of 42" centres to a minimum of 18" centres.

Small variations in centres are not important when using a 2 row unit but, when a 6 or 8 row machine is used, the build up in row width variations can result in the possibility of missing the outer rows.

It was obvious that some adjustment of row spacing on the machine would be required. The wide variation in crop rows would not permit full adjustment without excessive overhang.

Three basic row widths were required and these were set at a nominal 40" - 30" and 20" with adjustment of $\pm$ 3" from each standard setting.

(c) Feeding the threshing mechanism

The mixture of corn ears, leaves, some stalks, etc. must be picked up from each snapping unit and conveyed to a central point from which it can be elevated directly into the threshing cylinder. This involves two changes in direction of flow.

(1) Rearward to sideways

(2) Sideways to vertical

(d) Threshing efficiency

To modify the normal threshing and separating mechanism of the wheat Combine in order to reduce machine losses to a minimum and, at the same time, produce a "clean sample" with minimum cracking of grain.

(e) Quick Attachment

As the great majority of Corn Combines are used also in cereal crops, it is important that a change over from one type of "table", i.e. harvesting mechanism, to another be done with a minimum of labour and lost time. The farmer should be able to drop-off one unit and snap-on the other in a matter of minutes.

How all of these difficulties have been met and one of the resultant machines, which are proving themselves such a boon and stimulus to the grain corn farmer in Ontario, may best be appreciated in the short colour film, which will be shown at the end of the presentation.

CONCLUSIONS

According to the United States Department of Agriculture, the development of the Combine Corn Harvester has been one of the most dramatic and significant forward steps in agricultural technology. This development ranks in value and impact with that of the Self-Propelled Combine.

For Ontario Agriculture, the impact of the Combine Corn Harvester development is to be seen in the following results and potentials.

PRESENT RESULTS

1. Lower Cost corn production (less than 4 man hours per acre for growing and harvesting - 80 bushels per acre).
2. Ability to harvest larger crops with lower man-power requirements. One man can now harvest 4 acres per hour.
3. Improved timing of harvesting operations, reduces vulnerability to abnormal weather conditions.
4. Better competitive position with respect to
   (a) Western Grains for livestock feed.
   (b) Imported corn for starch and oil.
5. Better returns to the farm operator for his labour and investment.

FUTURE POTENTIALS

1. Greatly increased total grain-corn acreage.
2. Substantially larger individual acreages.
3. Much higher yields can be handled efficiently.
4. Reduced cost of livestock production (better and cheaper steaks.
5. Reduction of imports - improved balance of trade.
6. More cash return due to increased markets.
7. Better living for the farmer.

Agriculture to-day is a dynamic industry. It is Ontario's largest primary industry and is the foundation of our modern industrialized economy.

Through research, better management and mechanization, Ontario farmers are achieving high standards of efficiency - among the highest in the world.

Twenty years ago the farmer produced enough food to feed himself and 11 others. To-day he produces enough for himself and 30 others.

VICTORY OVER FAMINE *

Here in this favored Land of Plenty, it is hard to realize that today, hunger stalks man daily over vast areas of the globe. It has been estimated that five out of every ten people, taking the world as a whole, are ill-fed, two out of ten exist on borderline diets, leaving only three in ten who can be considered well nourished.

Why should the United States and Canada be so favored in this eternal struggle for daily bread?

The answer is high production per farm worker. In this part of the world, productive power is multiplied through the use of modern farm equipment. The North American farmer is a director of power, not its source. He has been blessed with FREEDOM -freedom to innovate, to succeed or to fail. This atmosphere encourages progress and stimulates production. Research and such developments as hybrid seeds, fertilizers, pesticides and herbicides have been a part of

this progress. Engineers added their touch by developing application machinery. V

Because modern equipment enables one man to produce so much more, it makes farming more profitable and lowers the cost of food.

If farmers everywhere had the freedom, know-how, machines and ample acreage to take advantage of this progress, hunger and famine in the world might well become only a memory.

*From "Land of Plenty" - Farm Equipment Institute

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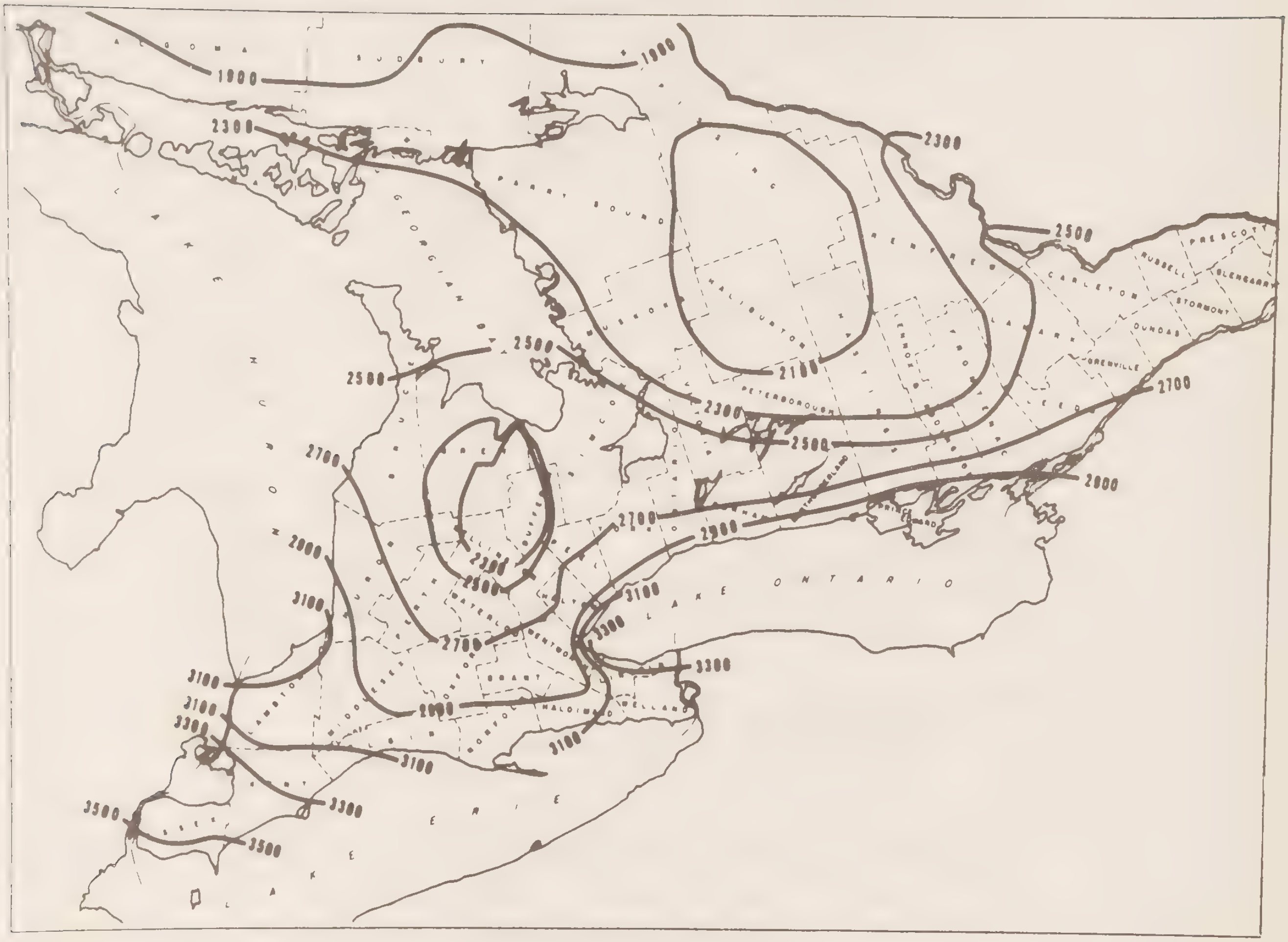
POTENTIAL CORN LAND IN ONTARIO



Average Heat Units available for Corn Production.

FIG. 2

NOTE: Areas with 2500, or more, Heat units are suitable for the production of grain corn.

COMPARATIVE FIELD LOSSES

VARIOUS HARVESTING METHODS

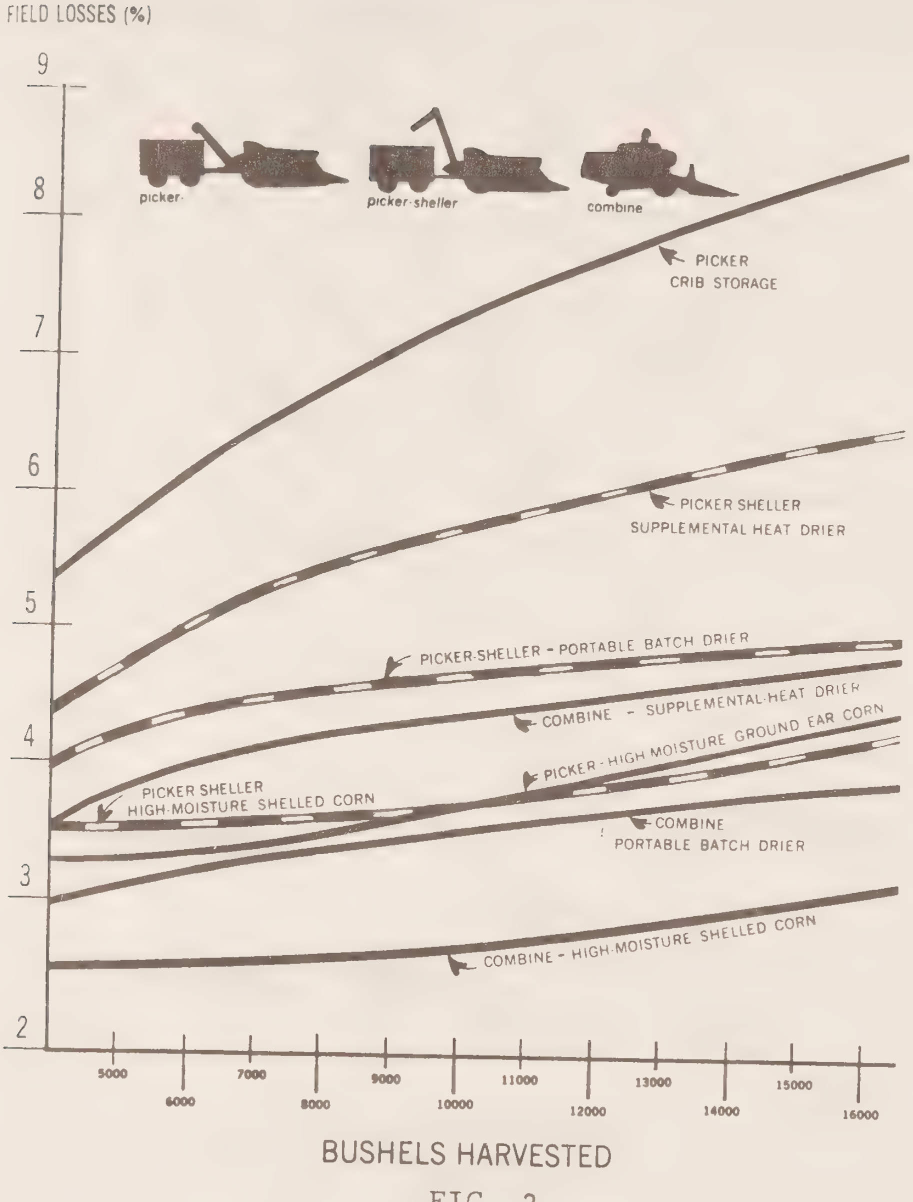


FIG. 3

Adapted from "Modern Corn Production"

It should be noted that, while the use of Corn Heads on Combines has increased rapidly, mechanical pickers continue to be the predominant corn harvesting method. The use of mechanical pickers is declining about 10% each year and the use of Corn Heads on Combines is on the increase. Picker-Shellers handle less than 10% of the crop and their use is likely to decline.

COMPARATIVE HARVESTING COSTS

VARIOUS HARVESTING METHODS

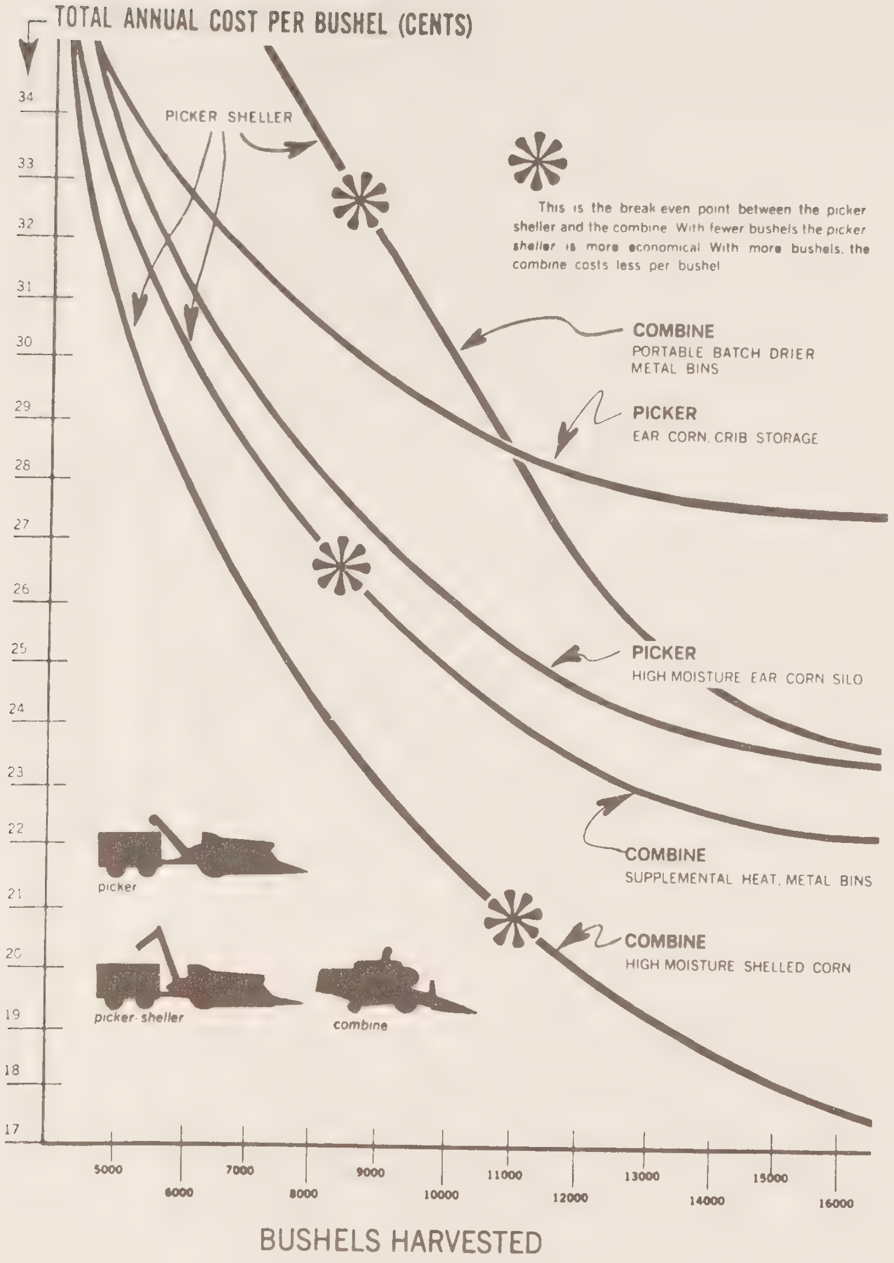


FIG. 4

Adapted from "Modern Corn Production"

NOTE: Costs shown are in U.S. currency for operations in that country. Canadian costs will be slightly higher.

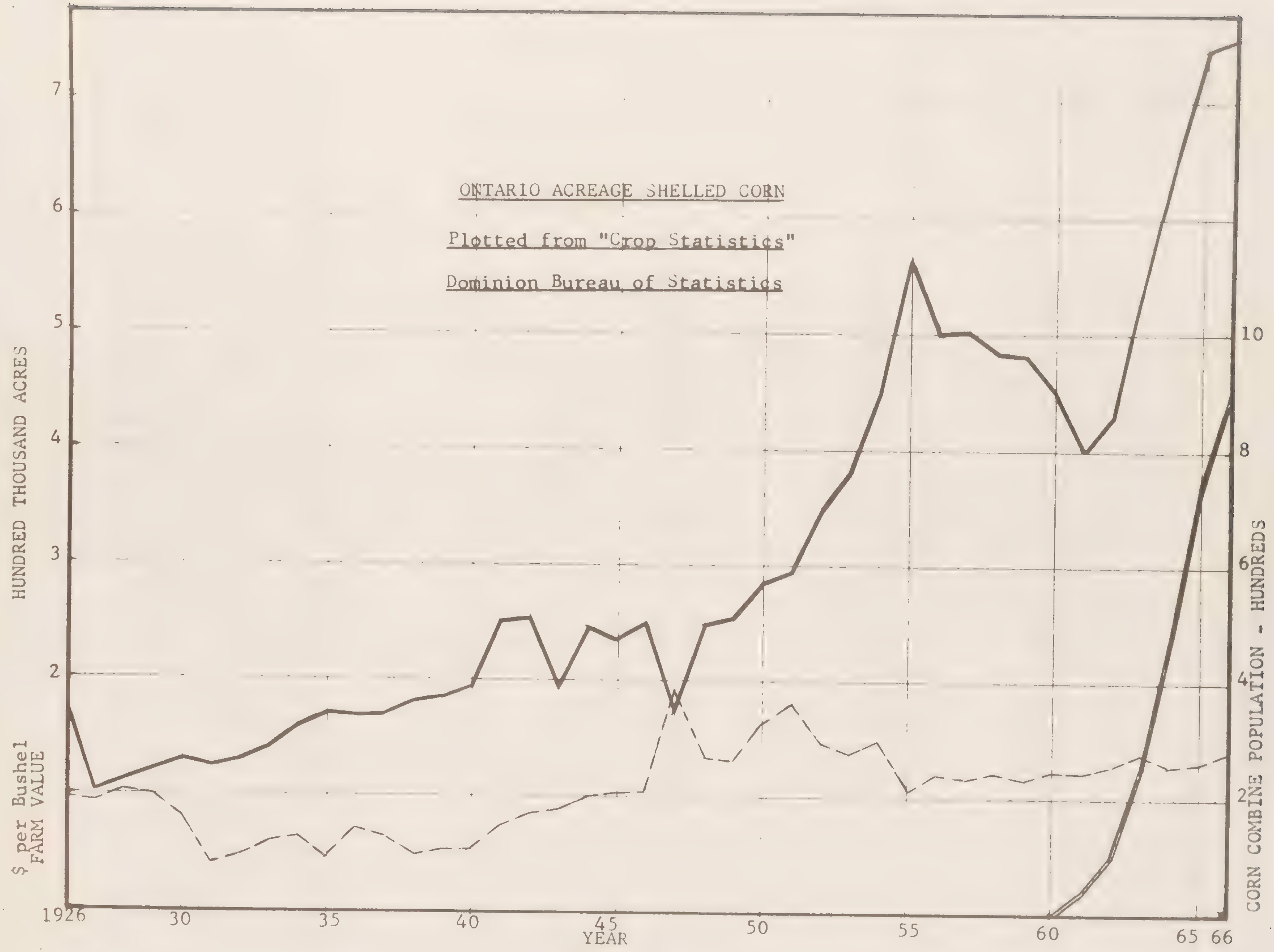

ONTARIO ACREAGE SHELLED CORN
Plotted from "Crop Statistics"
Dominion Bureau of Statistics
HUNDRED THOUSAND ACRES
$ per Bushel
FARM VALUE
CORN COMBINE POPULATION - HUNDREDS
YEAR
1926
30
35
40
45
50
55
60
65
66
7
6
5
4
3
2
10
8
6
4
2

FIG. 5

V

Paper No. 65-565

CORN HARVESTING EQUIPMENT - INFORMATION DISSEMINATION TO DEALERS AND FARMERS

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CORN HARVESTING EQUIPMENT - INFORMATION DISSEMINATION TO DEALERS AND FARMERS

My remarks regarding the subject of information dissemination will be confined to methods used by Massey-Ferguson Inc., the methods with which I am most familiar. While I am not speaking for the entire farm equipment industry, I suspect that methods used by other manufacturers are quite similar.

The program notes that my topic for discussion is Corn Harvesting Equipment - Information Dissemination to Dealers and Farmers. The methods used to disseminate corn harvesting equipment information are the same methods used to disseminate any other equipment information; therefore, this paper will discuss the subject of information dissemination generally.

From a commercial point of view, I am inclined to believe that our communication objectives are somewhat different than those of a public service organization.

A public service organization has a prime responsibility to communicate factual information to the public, as soon as it becomes available. The public service organization need not be concerned as to how such information may affect a farmers equipment purchasing decision.

On the other hand, a commercial organization has a prime responsibility to disseminate information that is not only factual, but is also beneficial to the marketing objectives of the enterprise. This situation requires that we in industry maintain a constant vigilance to insure that bias, prejudice and opinion is not disseminated as "factual information".

I am convinced that most farm equipment dealers and farmers are inclined to accept public service information at face value, whereas, the tend to classify all industry information under the general heading of "propaganda". I do not disagree with this line of reasoning, if the word propaganda is used in its true sense, which according to my dictionary is "any organized effort to spread information". I do adamantly disagree with those who use the word propaganda with the connotation that such information is false, misleading, or outright untruthful. I submit that today's industry propaganda is one of the most factual, reliable sources of information available to dealers and farmers.

Before I discuss methods used by our company for information dissemination, let me first establish the guiding objective. Being a commercial enterprise, our objective is to disseminate information that is factual, increases the stature of the company image and is in harmony

with our marketing objectives. I would illustrate this latter point with the following example: For the past few years, our manufacturing facilities have been used to produce far more corn heads for combines than corn pickers. Our marketing objective must, therefore, be to sell corn heads to a much greater extent than corn pickers. It then follows that our information dissemination objective will be to use factual information to influence people in favor of the use of combine corn heads.

As noted in the program, I will discuss information dissemination to dealers and farmers. I would prefer to discuss the subject in reverse order, therefore, at this point I will direct my remarks toward our methods of disseminating information to farmers.

I. Information Dissemination to Farmers

We have two lines of communication open between the company and farmer-customers; (a) written publications, and (b) verbal conversation.

(a) Written Publications - The written publications used to communicate with farmer-customers are many and varied.

1. Company published magazine - We retain an independent publishing firm to print a magazine called Farm Profit. This publishing company employs a number of staff writers who are experts in their fields. They prepare articles of general interest to farmers that cover a wide range of subjects; livestock management, accounting-tax procedures, recently developed fertilization and cropping practices, to name only a few. Incidentally, it has developed that one of the more popular sections of the magazine is that known as the Women's Section. Perhaps the farm wife has a bit more time for reading than the husband.

The staff writers prepare the various articles after gleaning information from those most knowledgeable in the field. In fact, several members of this Society have been interviewed and have contributed either directly or indirectly to the magazine content.

The magazine is sold to our dealers, who in turn mail it to their customers and prospective customers.

It is no coincidence that advertising copy is accepted for publication in the magazine from only one manufacturer.

The advantages of this type of communication are numerous. In the first place, farmers tend to accept the information contained therein at face value and are not so inclined to

pass it off as company "propaganda" It is believed this same line of reasoning adds credence to our advertising messages contained in the publication.

A disadvantage of the magazine approach to farmer communication is that more and more farmers have less and less time to sit down, relax and leisurely read and study a publication of this sort. It is becoming increasingly difficult for Sears Roebuck catalog and farm equipment publications to compete with entertainment such as Bonanza, Gunsmoke, and Lawrence Welk, even though both may be presented in four or more colors.

2. Advertising Literature - We, like others in the industry, spend millions of dollars annually to print and distribute individual brochures covering each piece of equipment in our line. These brochures are printed in color and are designed to arouse farmer interest in the product. The major product features are stressed and the key specifications are usually listed.

   The main advantage of this method of communication is that, calculated on a per-piece basis, the cost is low enough to permit wholesale distribution. Literature of this type is used for hand-out and mailing pieces extensively by our dealers.

3. Magazine Advertising - Magazine advertising, as a form of communication, is one of the oldest and is still probably the largest, in terms of money spent, methods used by the farm equipment industry to disseminate information to farmers. Frequently, dealers will run local newspaper advertising simultaneously that "ties-in" with national magazine advertising.

   This method of communication has the advantage of being able to reach large numbers of persons with the message, at relatively low cost per customer contacted.

   The main problem confronting this communication method, is the increasing competition for the farmers' few minutes leisure time, mentioned previously.

4. Operators Manuals - All of the communication media referred to up to this point is used to attempt to influence a farmer to consider the purchase of a piece of our equipment. At the time he makes an affirmative decision and a sale is consummated, he is given one more communication, an Operators Manual. This is the one piece of information that every farmer should read and study thoroughly, but unfortunately many of them do not seem to find the time.

(b) Verbal Communication - Verbal communication is usually a personal conversation and allows for a free interchange of expression, rather than being a one-way conversation, as is the case with written communication. V

1. Demonstrations and Field Days - We participate in all major national shows and exhibits, e.g., National Corn Picking Contest, Farm Progress Show, Ohio Farm Science Show, and Pennsylvania Farm Show, to name only a few. We also sponsor many field days and demonstrations in cooperation with our dealers.

   These events afford our company personnel an opportunity to communicate verbally, directly with farmers. There is good reason to believe that this is one of the most effective forms of communication open to us. At least it affords an opportunity to visit with farmers when we have their undivided attention. They come to events of this type because they want to see, they want to learn, and they want to talk, with knowledgeable people, regarding the latest machinery developments.

2. Radio and Television Commercials - Under the topic of verbal communication we must include mention of radio and television commercials as another form of communication. I would not include it as a method of information-dissemination of consequence, as it is of such short duration. It's main purpose is to arouse customers' interest or curiosity to the point that they will seek additional information, of one of the types mentioned previously.

II. Information Dissemination to Dealers

At this point, I will discuss the methods used to disseminate information to our dealer organization. Again, as was the case with farmers, we have two lines of communication available between the company and dealer; (a) written publications, and (b) verbal discussion.

(a) Written Publications - The written publications used to communicate with dealers are again many and varied. I will discuss only those most frequently used.

1. Product Information Manual - A Product Information Manual is printed and made available to every dealer, covering each major machine in our equipment line.

   The purpose of the Product Information Manual is to provide our dealers, and particularly their sales personnel, with a "text book" covering the Owner Benefit Features of

the machine, the accessory and optional equipment available and some suggestions for proper demonstration of the unit. You will note we do not include a "sales feature" section. We do not believe today's Agri-business farmers are interested in "sales features", per se. They are, however, interested in features that provide a recognizable, measurable benefit to the owner, hence the term "Owner Benefit Features". These features, designed into the machine by our engineers, are translated into terms of "Owner Benefits" by our technical writers. To be classified as an Owner Benefit, the subject must be measurable in terms of dollars and cents, in terms of increased productivity or in terms of anticipated increased service life.

2. Product Information Bulletin - As is the case with every manufacturer, the constant search for product improvement results in design changes from time to time. When this occurs, a Product Information Bulletin is issued to keep dealers, and their sales personnel, informed of the changes. This Bulletin, is in effect, an amendment to the Product Information Manual covering that machine. Over a period of time, several bulletins may be issued amending the original manual. When this occurs, a revised manual will be printed, incorporating the material contained in the bulletin.

3. Product Newsletter - On occasion, it is desirable to furnish dealers with general interest information that may relate to a changing or evolving farm practice; for instance, rather than to a particular machine. In this case, a Product Newsletter is prepared by a product specialist, and is furnished to all dealers. Example of subject matter covered in a Product Newsletter would be Nebraska Test data, competitive equipment information, the trend to narrow row corn, etc.

4. Product Information Handbook - It is recognized that dealer sales personnel need a handy reference book that can conveniently be carried as they make customer calls. To meet this need, we have available a pocket size Product Information Handbook. The handbook contains a one-page discussion per machine. The one page contains a highly condensed version of the Owner Benefit Features outlined in the Product Information Manual.

5. Other Publications - We, of course, provide the dealers with numerous other publications, e.g., Operators Manuals, Parts Books, Service Bulletins, Technical Maintenance Manuals, etc.

The problem with written communication to dealers is very similar to that experienced with communication to farmers; when do they find time to read it? The answer is that many of them simply do not. For this reason, we have found it increasingly necessary to rely on verbal communication to get the information to the dealers we feel they need.

(b) Verbal Communication - It is a well known fact that today's Agri-business farmers are considerably more "fact conscious" than were their predecessors. They are no longer content to deal with the farm equipment "peddler" of a by-gone era. More and more, the type of information they seek, and are entitled to receive, demands that they deal with a "sales-engineer". Our dealers are obligated to provide their Agri-business customers with the guidance and counselling that typifies the role of the "sales-engineer". Our company, in turn, is obligated to provide our dealers and sales personnel with the necessary training, so they can meet this challenge, and can render the sales-engineering service demanded by the Agri-business customer.

1. North American Training Center - To fulfill our obligation of dealer training, we have established a North American Training Center at Indianapolis, Indiana. This month marks the third anniversary of its operation in this location.

   Year around, service training classes are conducted in this facility. Here, mechanics are taught the latest methods and techniques used to overhaul and repair our equipment.

   A new, inexperienced man may start by selecting classes in basic hydraulic theory, basic electrical theory or basic engine tune-up. A more experienced man may broaden his knowledge by selecting classes in MF 1100 Tractor hydraulics, combine repair and adjustment, or diesel engine overhaul and tune-up, to list only a few of the 28 classes available.

   Cut-away assemblies are used extensively to add to the effectiveness of instructor-student communication. Experience has proven that cut-away component assemblies are vastly superior to drawings, and diagrams for this purpose.

   From mid-April to mid-October, the Training Center operates a 550 acre product training farm near Fairland, Indiana. The function of the training farm is to provide an in-field classroom for dealer sales personnel.

An equipment inventory in excess of a quarter million dollars is maintained throughout the training season. Practically every piece of equipment manufactured by our company is on display in the equipment line, and I might add, a few pieces manufactured by companies other than ours are also displayed. Obviously, it does not require this wide array of equipment to operate a mid-Indiana farm, but our students come from all areas of North America and a few from our overseas units. It is necessary to carry this large inventory if we are to provide field training covering equipment applicable to the various agricultural areas represented by the attending students.

For maximum effectiveness of instructor-student communication, the classes are purposely limited to small groups, no more than eight students per class. More frequently, they are assigned on a basis of five or six students per class.

Students who attend the product training school spend a lot of time in the field, learning first hand the correct operational techniques of our equipment, so they may pass this information on to their farmer-customers back home.

Lecture courses are employed to disseminate information acquired by the instructors regarding latest trends and developments in farm practices. A good example of a lecture course is one devoted to the subject of the proper usage of herbicides and insecticides. Included in this course would be a session covering the calibration of chemical applicators used in conjunction with our planters.

When it comes to such controversial matters as what row-spacing is best, we usually find it advantageous to straddle-the-fence. For example, we plant part of our corn acreage on 30 inch rows and the remainder on 40 inch rows. In this manner, we can provide training that will enable the students to discuss the subject more intelligently with their farmer-customers than they could if we provided training only in the practice we personally think is best.

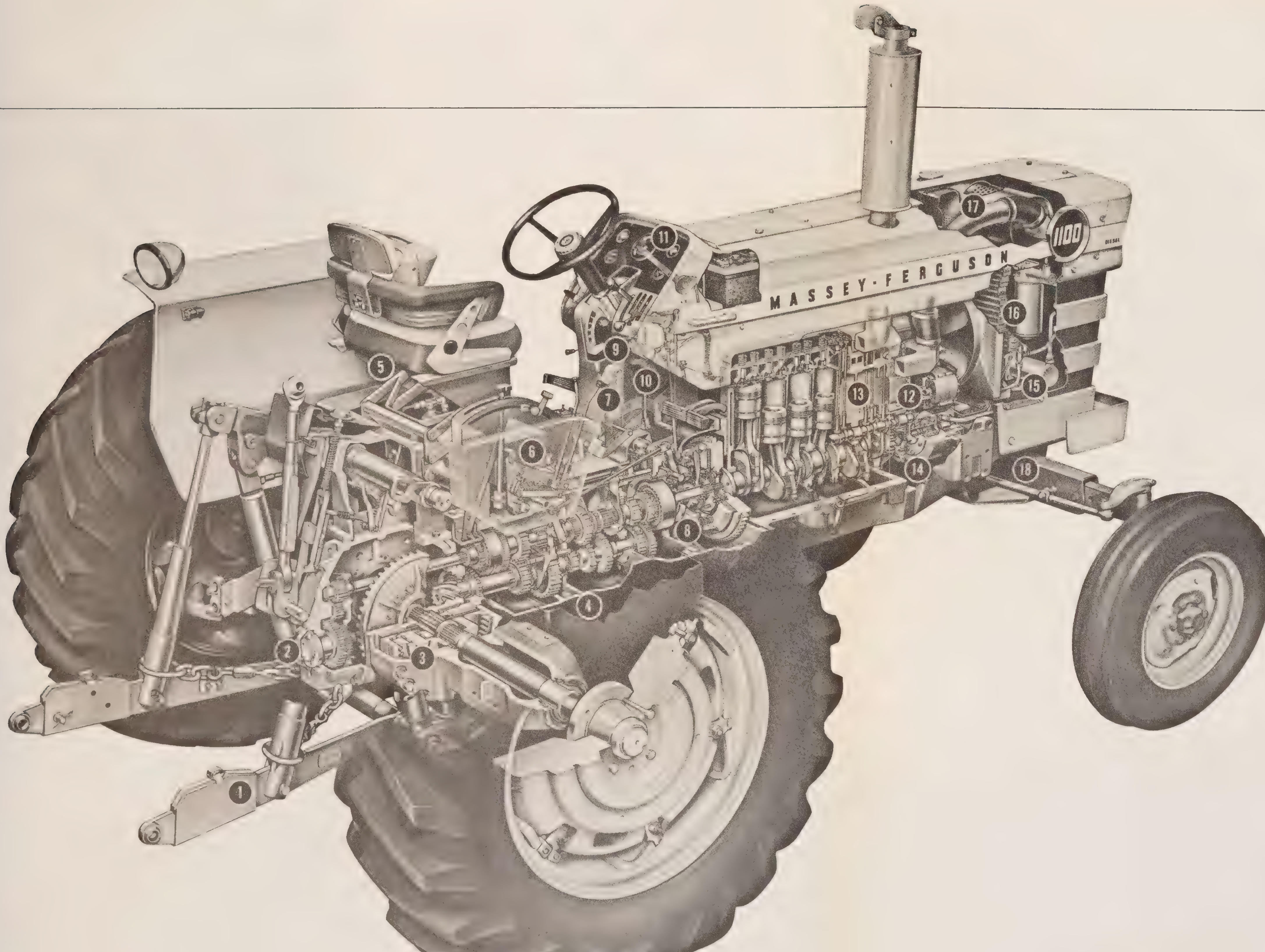
2. Local Training Schools, Demonstrations and Meetings - It is recognized that our facilities at the training center are not large enough to provide all the dealer training required in this day and age of rapidly changing technology. Therefore, we are constantly disseminating information to our dealers at Branch sponsored training

sessions and field days. In these instances, verbal communication is the prime method of information dissemination. The project referred to by the previous speaker is a recent example of the effectiveness of this type of communication.

Dealer recommendations: as indicated earlier in this chapter, through company-produced publications, e.g., product information manuals, and through courses of company-sponsored instruction, the company continually attempts to provide dealers and their salesmen with product use information. They, in turn, use this information to help the farmer select machinery suited to his needs. Company-produced sales brochures also assist the farmer in this regard with descriptions of the machinery and the conditions under which it is intended for use. The following fold-out shows an artists cut-away of the MF1100 from one of MF's sales brochures. The information contained in these brochures is valuable to the farmer in enabling him to evaluate the machine's characteristics in relationship to his particular needs.

Field demonstrations: the company participates in farm machinery field demonstrations held in conjunction with such events as the International Plowing Match. Such matches, of course, provide farmers a direct basis for comparison of competitive machinery. Additionally, the company encourages dealers and their salesmen to demonstrate the proper and safe use of MF machinery on farms of prospective customers. The farmer, thus, actually experiences the machine's performance in his own environment. Such a demonstration, for example, might also show the benefits of a specific machine feature, e.g., Pressure Control (which was demonstrated before large groups of farmers approximately 58 times in Canada in 1966.)

Inside the MF1100 Row Crop Tractor



1. Three-Point Linkage: lower links pull and lift the implement. Top link controls implement depth by sensing draft force.
2. Two-Speed PTO: hydraulic power-actuated PTO clutch provides completely independent PTO power. Two PTO drives—"live" or constant running and ground speed PTO. Two concentric output shafts for 540 or 1000 r.p.m.
3. Full Hydraulic Power Brakes: operate independently or together. Pedal latch for safe straight stopping. Safety circuit or manual operation.
4. Saddle-Type Fuel Tanks: interconnected, straddle-mounted fuel tanks are easy to fill. Capacity—MF 1130, 50 U.S. gals. MF 1100, 35 U.S. gals.
5. Hydraulic Power-Lift Seat: permits adjustment of position without leaving the seat . . . hydraulic adjustment of the air/oil suspension to match the weight of the operator.
6. Control Quadrant: single hand lever controls three different implement control functions . . . position control draft control, pressure control. Operator selects desired system by rotating a knob on the top of the lever.
7. Auxiliary Hydraulic Control Valves: provide convenient operation and control of remote single or double acting cylinders used to raise, lower or position trailing implements.
8. Multi-Power Transmission: 12-speed Multi-Power transmission is standard equipment on all models. Permits changing ground speed while on-the-go and under load.
9. Vari-Arc Steering Column: steering column can be tilted from a vertical position downward to an angle of 48° from vertical. Five equally spaced positions are provided within the tilt range.
10. Hydrostatic Steering: hand metering pump provides emergency steering should the engine or main pump fail.

11. Panel-Mounted Controls: transmission high/low range lever, gear shift, throttle, Multi-Power Control and PTO clutch control are located on the panel within easy reach of the operator.

12. 12-Volt Electrical System: uses two 96 amp. hr. batteries. Alternator keeps batteries charged even when the engine is idling.

13. Direct Injection Diesel Engines: direct porting plus direct injection provide excellent fuel economy, easy starting and high lugging ability. Both turbo-charged (MF 1130) and naturally-aspirated engines (MF 1100) displace 354 cu. inches. Compression ratio is 16.1.

14. Variable Volume Hydraulic Pump: automatically adjusts its output upon demand from 0—20 g.p.m. Provides power for the operation of power steering, power brakes, remote hydraulic cylinders, and the lifting and control of implements.

15. Hydraulically Powered Steering Actuator: rack and pinion mounted on the front axle supports rotates the steering arm hydraulically. There's no mechanical linkage between the steering wheel and the tractor front wheels.

16. Hydraulic Oil Cooler: charging pump supplies hydraulic oil (regulated at 95 p.s.i.) to a 20 micron filter and from there to the oil cooler. Delivery, on demand, is from the cooler to the high pressure pump.

17. Dry-Element Air Cleaner: large capacity dry element needs less attention and is more efficient, less messy than oil bath types.

18. Front Axle: Wide row crop model has a heavy duty box construction axle. Dual tricycle tractor has a new type pedestal for mounting larger tires. Triple lip oil seals increase bearing life.

Technical information for purchaser: after a potential customer buys his information needs change with respect to the machine he has acquired. As the owner or operator, he then becomes directly concerned with the field operation and field maintenance of his machine.

The professional technical writers at MF's North American Training Centre who prepare the technical maintenance volumes, product information manuals and other publications described earlier, also prepare operator's manuals. In them, they put in words and pictures what MF's professional instructors would say and demonstrate to explain a machine, its operation and maintenance to a new owner if the face-to-face opportunity existed. The men who write these manuals, as indicated earlier, in addition to being professional technical writers, have a solid understanding of agriculture and its attendant problems, and they are familiar with the machines they tell others how to operate and maintain.

As an example of the thoroughness of the owner's manual, the MF510 combine manual contains 144 pages, 150 illustrations and about 75,000 words. It covers more than 300 topics ranging from safe operation to trouble shooting, maintenance, adjustments of all kinds for different crops and crop conditions and many more areas of knowledge essential to successful, efficient and safe operation of the combine.

These manuals are furnished at no charge with the new machines. The provision of the manual is the natural and necessary follow-on step in MF's

sequence of communications to help both potential customers and actual purchasers.

Massey-Ferguson recognizes that its obligation is not met by seeing that the farmer receives a machine that is properly set up. The company's own self-interest depends on the success the farmer has in using his MF machine.

Last winter this Royal Commission heard one witness state that Canadian farmers are adding $150 million to their annual labor bill because of poor methods of operating machinery. MF believes that without the operating information it provides its customers, this amount might be considerably higher.

The technical maintenance manual and the company's practice in regard to making it available to the farmer has already been described. In addition to these sources of information, the farmer has available through his dealer the advice and assistance of the branch or regional service manager and his staff of service specialists.

Advertising: MF advertises to create and reinforce customer awareness of MF machinery, its features and the specific advantages it provides. Because of the increasingly complex nature of farming and the machinery it requires, some MF advertising might be said to contain "technical"

data. The point is not to argue whether some of the information hopefully conveyed is "technical" or not; this is a moot semantic point. The essential point is whether the statements made are accurate. With respect to this question, it is MF policy, when the company believes that reasonable doubt might exist about the accuracy of its claims, to have the basis of such claims field-tested and evaluated by an impartial, qualified and recognized third party.

Last fall, such testing was conducted on Pressure Control by the Nationwide Consumer Testing Institute, Inc., of Hoboken, New Jersey, which also maintains offices in Boston, Massachusetts; Chicago, Illinois; Denver, Colorado; Los Angeles, California; Memphis, Tennessee; New York, New York; Philadelphia, Pennsylvania and Tulsa, Oklahoma. The following pages show:

- the summary of the field test results, signed by the supervising engineer;

- a booklet describing the tests themselves;

- a sample advertisement containing some of the conclusions resulting from the tests;

- a certification of accuracy of Pressure Control advertising statement: (see bottom of last page of advertising copy).

Nationwide Consumer Testing Institute, Inc.

BOSTON
DENVER
CHICAGO
TULSA

ESTABLISHED 1880
HOBOKEN, N. J.
TELEPHONE: SWARTHMORE 2-2400

NEW YORK
PHILADELPHIA
LOS ANGELES
MEMPHIS

REPORT OF TEST

Massey-Ferguson Inc.
Des Moines, Iowa

Test No. 85654 October 17, 1966

Massey Ferguson
Tractor Evaluation

SIGNED FOR THE COMPANY

BY Clive R. Van Orden

Clive R. Van Orden

SUMMARY

A comparative field study of Massey Ferguson Tractors equipped with "Pressure Control" vs seven competitive brands was supervised by Nationwide Consumer Testing Institute, Inc. The tractors used in the test were all current production models.

The test program consisted of six events:

I - DISC Harrow Test

II - Plow Test

III - Chisel Plow Test (Pressure Control vs 4 wheel drive)

IV - Handicap Race

V - Hill Climb

VI - MF 165 with and without Pressure Control

All testing was performed at the Massey Ferguson training farm in Fairland, Indiana, on October 4, thru October 7, 1966 and October 25, 1966.

The findings of the comparative tests indicate that Massey Ferguson tractors equipped with "Pressure Control" exhibited less wheel slippage than the competitive models in all events.

Massey Ferguson Model 165 climbed the same hill faster than two competitive models with the identical load.

In the handicap race, a Massey Ferguson Model 180 disced a test field faster and with less slippage than a competitive tractor with 10 more horse power.

Supervised By:

Rudolph L. Giglio

Rudolph L. Giglio
NATIONWIDE CONSUMER TESTING INSTITUTE, INC.

MASSEY-FERGUSON

PRESSURE CONTROL

. . . reduces wheel slippage as much as 50%

. . . gives the pull of tractors with 10 more horsepower

. . . gives as much traction as auxiliary 4-wheel drive

. . . takes only 8 hours for a 9-hour discing job

HERE'S PROOF

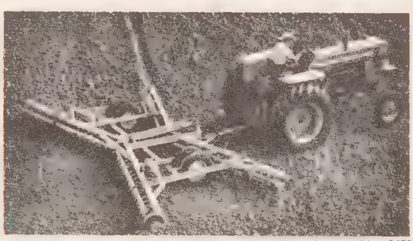
Why MF owners say: "Pressure Control claims are true..." proven every day on the farm... by farmers,

but skeptics say: "fantastic claims", "unbelievable", "can't be done, etc."

SO WE TOLD THE WORLD ABOUT PRESSURE CONTROL WITH NATIONAL ADS SUCH AS THIS:

We say: "Pressure Control on MF Tractors gives more traction by cutting wheel slip as much as 50%."

(Hard to believe?)



94 hp MF 1100 with 21 ft. MF 52 Disc. Opposite. 63 hp MF 175

Make us prove it.

Pressure Control is Massey-Ferguson's exclusive traction control system for working pull-type implements. It transfers thousands of pounds of extra traction weight to the tractor's drive wheels—instantly, at the touch of a lever

This reduces wheel slippage by as much as 50%. Provides lots more traction when you need it.

Gives the MF 180 the pull of tractors with 10 more horsepower.

Gives as much traction as tractors with auxiliary 4-wheel drive, at much lower cost

Hard to swallow? Your MF Dealer has PROOF certified by the country's foremost independent testing company, based on the tests of MF Pressure Control tractors against leading competitive makes

And ask your MF Dealer to show what Pressure Control can do for you on your farm

MASSEY-FERGUSON

See how Pressure Control works:

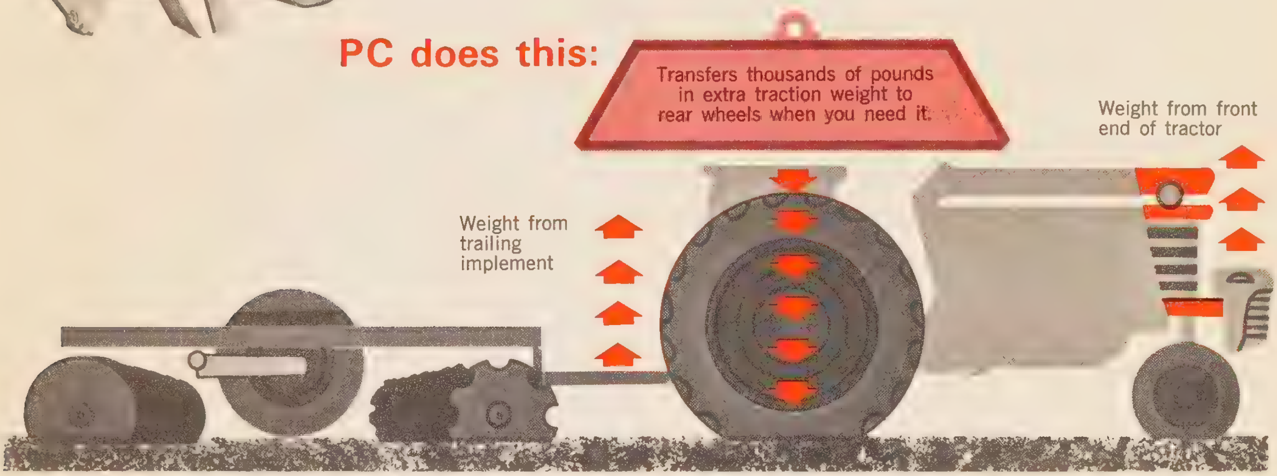
You do this:

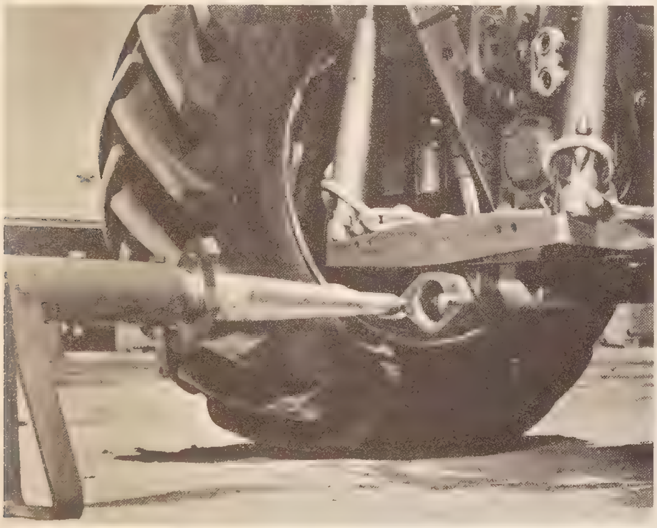
Move this little lever up when you need more traction . . . move it down when no extra traction is needed. Pressure Control, the amazing and exclusive addition to the Ferguson System actually transfers traction weight from pull-type implements such as plows, discs and wagons to the rear wheels of MF tractors.

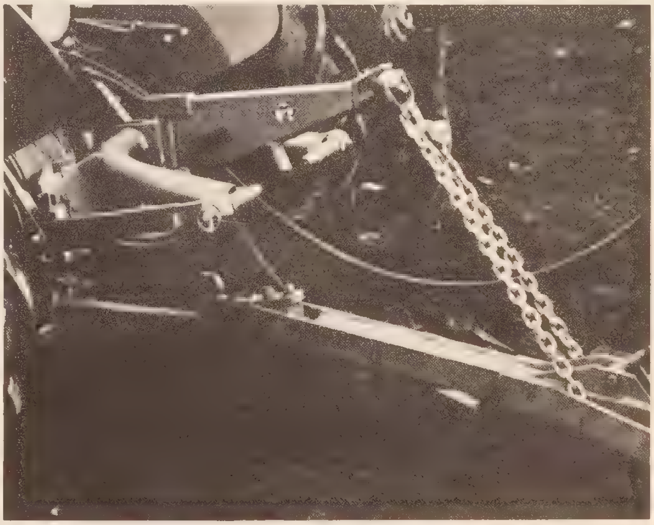
This may be done without affecting the working depth of implements.

Extra weight from the tractor's front end is also transferred to the rear tractor wheels simultaneously. PC, the ultimate in tractor hydraulics, makes tractor operators masters of tough traction situations with one little lever.

PC does this:







Cone and Socket PC Hitch

Here's the "cone and socket hitch" that introduced PC on big North American farms and helped make it famous around the world. Fits 5-plow and larger MF tractors. Allows big trailing implements to turn and flex with changing terrain . . . provides you with all the extra traction possible where the going gets really tough.

Universal PC Hitch

Also sold around the world, this "Universal PC hitch" fits 4-5 plow and smaller size MF tractors, In use on farms from Australia to the Zuider Zee . . . now in mass production for North America where cost conscious farmers need the ultimate in efficient tractor features. Try an MF Pressure Control tractor on your farm.

Pressure Control: Tested, Tried and Proved by

World's Most Diversified Independent Testing Laboratory

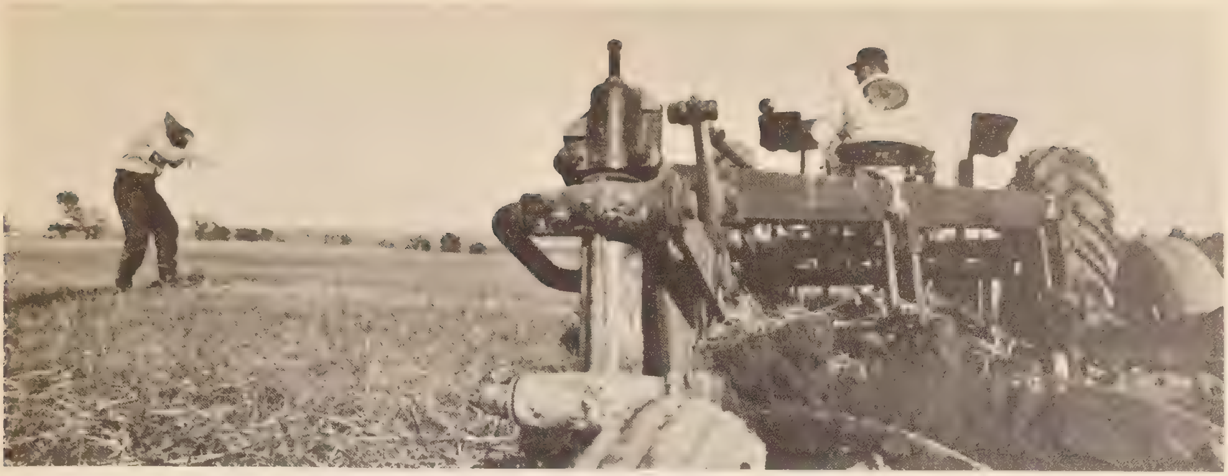
Nationwide Consumer Testing Institute, Inc. with several hundred scientists, experts and technicians serves clients in almost every segment of commerce, industry and government.

Massey-Ferguson chose this particular company to test Pressure Control for several reasons. Nationwide's years of professional experience combined with necessary scientific equipment have established a tremendous reputation in such areas as Engineering Analysis, Reliability Testing, Product Evaluation, Physical Testing, Hydraulics . . . also in the testing of materials, electronic and mechanical devices, and motor powered equipment.

Product Quality Evaluation by this impartial, highly qualified and recognized third party completely supports the MF advertising claims for Pressure Control.

Field test ground was approved by the testing laboratory for reasonable levelness and uniformity as you can see in these pictures. A test run was accurately measured off at 330 feet. Two engineers with walky-talkies and stop watches were stationed at each end.

Eighteen tractors (7 Massey-Ferguson and 11 competitive models) were tested. Each power class pulled identical implements preset to cut the same depths. Gear ratios were selected to provide minimum slippage at full throttle operation.



Get ready, set . . . go!! On the Test Engineer's signal a pull-type plow with three 14-inch bottoms set to cut seven inches deep moves out behind a Massey-Ferguson 150. Pressure control proves its worth in cutting wheel slippage and upping tractor work capacity.

Accuracy and fairness is the order of the day as Nationwide engineers confer on each test run and give every competitive tractor the benefit of the doubt. Repeated runs are made whenever necessary to prove the complete capability of each tractor model. Depths of cuts are measured before and after each run.

Double check and triple check all figures. Here you see no less than four engineers measuring and checking chalk marks which indicated working depths of chisel plow shanks before they were raised out of the ground.

You can have more confidence going up and down hills with PC because of greatly increased traction . . . even with a 5-ton load of wet corn as you see on the approximately 24% slope above. Pressure Control allowed safe stops and starts on downgrade. Other makes skidded while stops were attempted on the same downgrade.

MF Claim:

Pressure Control gives more traction by cutting wheel slip as much as 50%.

Field test certifies that MF wheel slippage was reduced as much as 78.3% when comparing eleven competitive tractors with six MF tractors which had Pressure Control fully applied.

Wheel revolution counters were mounted on each tractor and set to zero before each run started. Above is a typical end of run reading.

This kind of scene was repeated day after day as finely tuned tractors were brought to the test area after equipment approval checks by Nationwide Field Test engineers.

Proof Report

Test No. 85654 conducted by Nationwide Consumer Testing Institute is the basis for Massey-Ferguson advertising claims which were approved by the independent laboratory before being published. Their report has been interpreted in practical farm language and supported by tables of data. Condensation of wheel slippage tests follow.

Wheel Slippage Report

Tractors	Weight	Power Class	RPM Under Load	PC Cuts Wheel Slip By This % Compared With Other Makes	Depth of Cut Setting	MF 52 Disc Harrow	MF 125 Chisel Plow
MF 135 Make "A"	4,520 4,970	3-plow 3-plow	2000 2000	—— 38.1%	Full Full	10′6″ 10′6″	
MF 165 Make "B" Make "E"	6,150 9,380 7,850	4-plow 4-plow 4-plow	2000 1700 1800	—— 12.5% 34.6%	Full Full Full	13′8″ 13′8″ 13′8″	
MF 180 Make "B" Make "C"	7,300 10,040 11,220	5-plow 5-plow 5-plow	2000 2000 2000	—— 73.2% 66.6%	Full Full Full	13′8″ 13′8″ 13′8″	
MF 1100 Row Crop Make "B" Make "D" Make "C"	10,578 11,870 13,050 13,250	6-7 plow 6-7 plow 6-7 plow 6-7 plow	2100 2000 2000 2100	—— 68.6% 65.3% 65.3%	6.75″ 6.75″ 6.75″ 6.75″	21′ 21′ 21′ 21′	
MF 1100 Western Make "G"	11,230 12,330	6-7 plow 6-7 plow	2000 2000	—— 59.9%	12″ 12″	—— ——	26′ 26′
MF 1130 Make "C" Make "F"	12,410 14,240 12,130	7-8 plow 7-8 plow 7-8 plow	2150 2300 1950	—— 78.3% 57.9%	Full Full Full	27′4″ 27′4″ 27′4″	

MF Claim:

Pressure Control gives the 63 hp MF 180 the pull of tractors with 10 more horsepower.

Field test certifies that the MF 180 discing rate was 1.3 acres per hour greater than competitive tractor "C" which had more than 10 extra horsepower.

Proof Report

Both tractors started simultaneously with wheel revolution counters attached and each pulled an identical implement set to the same depth over the same 330-foot distance. Each tractor was timed independently. The MF 180 finished 10 seconds ahead of competitor "C" and with considerably less slippage. Calculated results and test data are shown below.

10-Horsepower Handicap Report

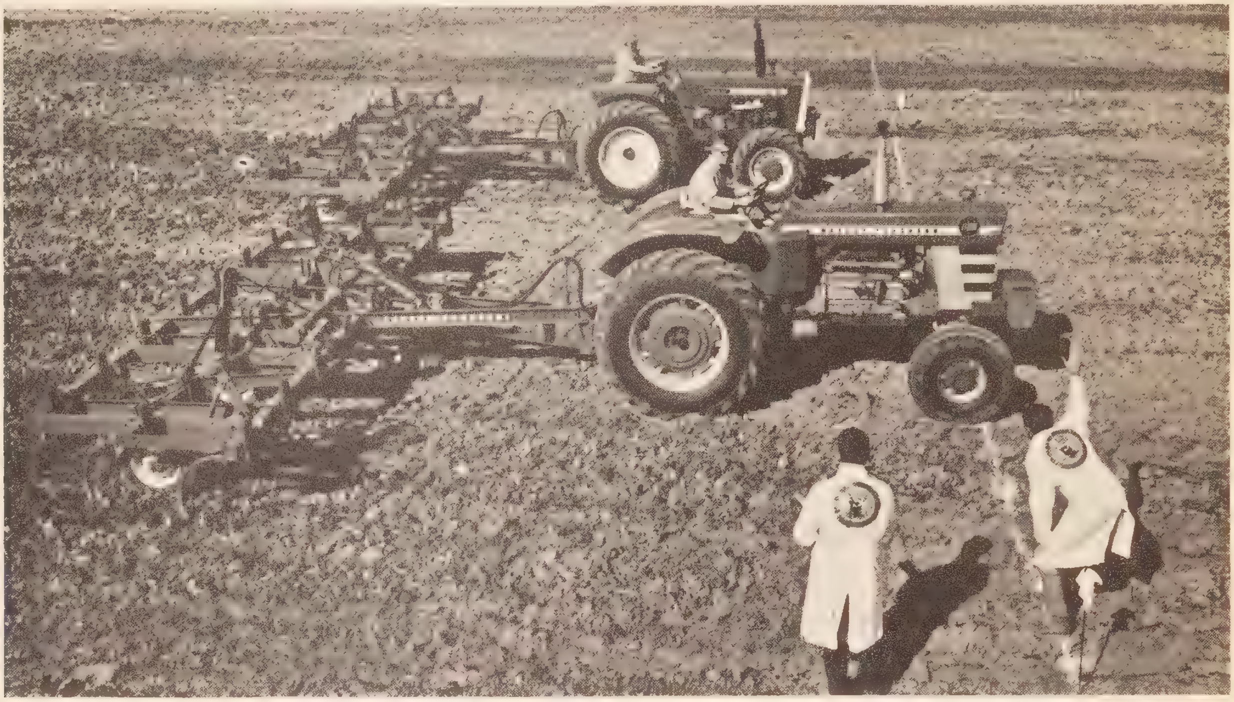
Tractors	Weight	*Max. PTO or Belt HP @ Rated Engine RPM	RPM Under Load	Time in Seconds	Discing Speed in Acres Per Hour	Depth of Cut	MF 52 Disc Size
MF 180	7,300	63.68	2000	42	8.4	Full	13′8″
Make "C"	11,220	73.82	2000	52	7.1	Full	13′8″

*Reference—Implement & Tractor Red Book, 1966

MF Claim:

Pressure Control gives the 94 hp MF 1100 as much traction as tractors with auxiliary 4-wheel drive at lower cost.

Field test certifies MF 1100 actually outperformed a competitive tractor equipped with 4-wheel drive in the same power class.



If traction is your problem why buy auxiliary 4-wheel drive when MF Pressure Control does a better job at less cost . . .less maintenance, too.

Proof Report:

Not only did Massey-Ferguson's 1100 Western model outperform a competitive 4-wheel drive model but the MF tractor had 21.4% less wheel slippage as noted in the data below.

4-Wheel Drive Test Data

Tractors	Weight	Power Class	RPM Under Load	PC Cuts Wheel Slip By This % Compared With Other Make	Time in Seconds	MF 125 Chisel Plow
MF 1100 Western	12,330	6-7 plow	2000	——	59.5	26′
Make "D"	13,110	6-7 plow	2000	21.4	63.0	26′

MF Claim:

With Pressure Control you can do a discing job in 8 hours that ordinarily takes 9.

Field test certifies that many of the competitive tractors tested would require more than 9 hours to complete the amount of discing comparable Massey-Ferguson tractors with Pressure Control could accomplish in 8 hours.

The MF 1100 tractor with PC disced from 15% to 29.8% faster than three competitive tractors.

Proof Report:

Pressure Control tractors increased discing rates up to 32.4% when compared with 11 different competitive tractors as recorded below. Depending on the amount of turning required, usually about a 15% increase in discing speed will save at least one out of 9 working hours.

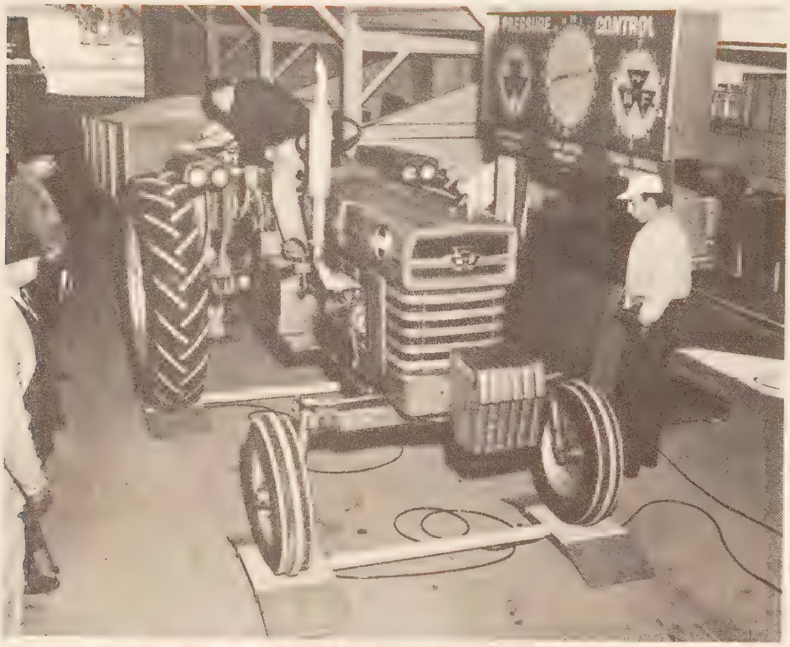
Discing Speed Data

Tractors	Weight	Power Class	RPM Under Load	MF Discing Speed Was This Much Faster Than Competitive Models
MF 135	4,520	3-plow	2000	——
Make "A"	4,970	3-plow	2000	28.2%
MF 165	6,150	4-plow	2000	——
Make "A"	7,080	4-plow	1850	20.0%
Make "B"	9,380	4-plow	1700	32.4%
Make "E"	7,850	4-plow	1800	25.0%
MF 180	7,300	5-plow	2000	——
Make "B"	10,040	5-plow	2000	12.2%
Make "C"	11,220	5-plow	2000	18.0%

Tractors	Weight	Power Class	RPM Under Load	MF Discing Speed Was This Much Faster Than Competitive Models
MF 1100	10,578	6-7 plow	2100	——
Make "B"	11,870	6-7 plow	2000	15.0%
Make "D"	13,050	6-7 plow	2100	29.8%
Make "C"	10,578	6-7 plow	2100	18.5%
MF 1130	12,410	7-8 plow	2150	——
Make "C"	14,240	7-8 plow	2300	23.7%
Make "F"	12,130	7-8 plow	1950	19.6%

Certified MF Pressure Control traction weight transfer model by model

Tractor Model	Weight Without P C Applied			With P C Applied	
	Front Axle Weight	Trailing Implement Weight	Rear Axle Weight	Rear Axle Weight	Weight Transferred to Drive Wheels
	lbs.	lbs.	lbs.	lbs.	lbs.
135	2650	4300	3000	5100	2100
150	2800	4300	3400	5500	2100
165	3000	4300	4700	6800	2100
175	2600	2600	5000	7000	2000
180	2800	4300	4500	6600	2100
1100	4900	4200	6400	9950	3550
1130	4900	4100	9200	12900	3700



A load cell type of scale was used by Nationwide engineers to weigh the front and rear wheels of each tractor model before and after application of Pressure Control. Trailing equipment weight was represented by a 4-wheel wagon on all but the 1100 and 1130 where disc harrows were used. Check the right hand column above for the amount of extra traction weight you can have on your next tractor . . . if it's a Massey-Ferguson with PC.

Pressure Control is available on all these Massey-Ferguson Tractors.

Now you can get Pressure Control on MF tractors from 38 horsepower to the big 120 horse models. As many 1967 MF models as possible will be available with Pressure Control, but since there may not be quite enough to go around it could pay you to get your order in early.

Just imagine how much extra work you can accomplish in a day . . . acres more in hours less time. And you'll do it with less fuel and less tire wear when you have the exclusive Massey-Ferguson Pressure Control. Once you've used the advanced Ferguson System you'll realize the many more ways MF gives you more tractor for your money.

Your Pressure Control investment has been field-proven for you . . . but

you will want to see for yourself. So stop at your MF dealer's and climb aboard a new P C tractor.

See how simple PC is to operate. Calculate how many dollars extra in farm profit Pressure Control can mean in your operation. PC can also mean profit control for you because with it you will reach a new peak in efficient tractor power.

Put a Massey-Ferguson Pressure Control tractor to work on your farm.

FIELD TEST PROOF

MASSEY-FERGUSON

PRESSURE CONTROL

IS THE BIGGEST MONEY SAVING TRACTOR FEATURE AVAILABLE

NATIONWIDE CONSUMER TESTING INSTITUTE, INC.

FIELD TESTED AND EVALUATED

SCIENCE

INDUSTRY

LITHO IN CAN.

C 435/1166-24-1

We say: "Pressure Control on MF Tractors gives more traction by cutting wheel slip as much as 50%."

(Hard to believe?)

MF Pressure Control on 5-plow MF 175 (above)

Make us prove it.

Pressure Control is Massey-Ferguson's exclusive traction control system for working pull-type implements. It transfers thousands of pounds of extra traction weight to the tractor's drive wheels—instantly, at the touch of a lever.

This reduces wheel slippage as much as 50%. Provides lots more traction when you need it. An MF tractor with Pressure Control enables you to disc extra acres a day!

Pressure Control makes Massey-Ferguson Tractors pull heavier loads or work bigger pull-type implements than you'd ever expect from tractors of their power classes.

Hard to believe? Ask your MF Dealer for PROOF, certified by the world's most diversified independent testing laboratory, based on tests of MF Pressure Control tractors against leading competitive makes. Ask for a demonstration of what Pressure Control can do for you on your own farm. For a limited time, tractor buyers receive the Pressure Control hitch at no extra cost.

These models available with MF-Perkins direct injection diesel power plants, or gasoline engines.

Advanced Ferguson System for mounted and semi-mounted implements. Multi-Power on-the-go shift. Differential Lock. Comfort Seats. Live PTO or new Independent PTO. Dry element air cleaners. Manual or power steering.

1867 1967

MASSEY-FERGUSON

Massey-Ferguson Industries Limited, Toronto

ow MF 135 with Pressure Control

plow MF 165 with Pressure Control

5-plow MF 180 Row-Crop with Pressure

Circle No. 19 on Reply Card

Needham, Harper & Steers, Inc. 401 N. Michigan Avenue Chicago, Ill.

CB-5 V

MASSEY-FERGUSON INC.
6 Page Pressure Control Tractor Line Ad - 4/C

RV (5) 10/31/66 (13-ay)

CLIENT OK 10/26/66

Ad No. 401 WO AM-2469

Page 1 - cover

(headline) Massey-Ferguson's Pressure Control is the most important tractor advance in 32 years.

(smaller) (Since the introduction of the Ferguson System of weight transfer in 1935.)

(photo: P.C. hitches) Pressure Control Hitch for MF 135, 150, 165, 175, 180.

Pressure Control Hitch for MF 175, 180, 1100 and 1130.

Page 2, 3

(headline) We say: "Pressure Control gives the 63 hp MF 180 the pull of tractors with 10 more horsepower."

(copy) Pressure Control is Massey-Ferguson's exclusive traction control system for working pull-type implements. It transfers thousands of pounds of extra traction weight to the tractor's drive wheels -- instantly, at the touch of a lever.

This reduces wheel slippage as much as 50%.

Increases traction so much that it gives the MF 180, for example, the pull of tractors with 10 more horsepower.

Makes the 3-plow MF 135 and 150, or the 4-plow MF 165, pull heavier loads -- or work bigger pull-type implements -- than you'd ever expect from tractors of their power classes.

We say that with Pressure Control you get a lot more tractor for your money.

(Hard to believe?)

(captions for photos)

(for left hand page) Pressure Control now available in the 4-plow MF 165 (below) and the 3-plow MF 135 and 150.

(for right hand page) Pressure Control is available in the 5-plow MF 175 and MF 180 (below).

Page 4, 5

(headline) We say: "Pressure Control gives the 94 hp MF 1100 as much traction as tractors with auxiliary 4-wheel drive."

(copy) You get power aplenty in the giant MF 1100 Series tractors: 94 hp. in the MF 1100, 120 hp. in the turbocharged MF 1130.

And Massey-Ferguson's exclusive Pressure Control puts this big power to work as never before.

A touch of a lever transfers thousands of pounds of extra traction weight to the drive wheels, reducing wheel slippage as much as 50%.

This gives these big tractors as much ground-gripping traction as tractors with auxiliary 4-wheel drive, at far less initial cost.

With stepped-up traction, you work the fields faster ... so much faster you can do a discing job in 8 hours that would take 9 with other tractors of the same horsepower.

That's why we say Pressure Control is the most important tractor advance in 32 years.

(Hard to believe?)

(photo: 1130 with tandem rig)

(captions for photo)

(for left hand page)	Pressure Control is available in the 120 hp. MF 1130 and the 94 hp. MF 1100.
(for right hand page)	6-cylinder direct injection diesels. Gasoline engine available in MF 1100.

Page 6

(headline)

OK. We've said
a mouthful about
Pressure Control.

Make us prove it.

(copy)

Ask your MF Dealer for PROOF, certified by the country's foremost independent testing company, based on tests of MF Pressure Control Tractors against leading competitive makes. Ask for a demonstration of what Pressure Control can do for you, right on your own farm.

Massey-Ferguson
Massey-Ferguson Inc., Des Moines, Iowa

(photo: all 7 basic models of MF tractors)

(caption for photo)

Pressure Control is available in all MF Tractors from the 3-plow MF 135 to 120 hp. MF 1130. In most models, the Pressure Control hitch comes with the tractor.

We have read the accompanying advertising copy to appear in national farm magazines. Nationwide Consumer Testing Institute has made extensive field tests of these statements and hereby certifies their accuracy.

A. J. [illegible] 11/7/66
Rep., N.C.T.I.

ADVERTISING ETHICS

The charge of misrepresentative advertising is easy to make and, practically speaking, impossible to disprove except in a legal sense. The most that can be done to "disprove" it is to attempt to establish MF's good intent. Naturally, MF is interested in selling tractors, combines and its whole catalogue of farm machines. To market them least expensively, the company believes it must advertise them. But MF is absolutely opposed to and does not practice false representation of its machines, their performance or capabilities --and for two very good reasons: first,it would be dishonest to do so; second, it would be bad business to do so, costing far more in the long run than the short-time gains could offset.

False Demand

A second charge is sometimes raised against advertising practices in the farm machinery industry, namely, the charge of creating false demand.

False demand is a complex subject, and any thorough and accurately detailed treatment of it and its ramifications would require all the skills social science offers. However, the company viewpoint, which is severalfold, should be stated: namely, that false demand, in any sense that it might be applied to the farm machinery industry, is not a purposefully induced force which can be let loose on the market.

If false demand seems to exist from time to time, it might more accurately be termed an aberrant, unpredictable and short-lived instance of consumer behavior over which the industry certainly has no more control than those who are manifesting such behavior.

The personality and social needs which might be satisfied by powerful tractors are not significantly fed or excited by advertising; they are fed by many factors within each individual's total environment, of which farm machinery advertising constitutes a minuscule proportion.

Finally, with regard to false demand, to the extent that it may exist, MF believes it to be an uncontrollable, but self-eliminating, phenomenon. As such, it does not offer this industry the characteristics necessary with which to wield it.

The concept of "false demand" is closely related to the idea of having "too much" or "too powerful" machinery. In this regard, it is interesting to note an article in the May 1967 COUNTRY GUIDE. This article, called, 'Making Farm Machinery Pay", was written by A.R. Jerry Jones, supervisor, farm management branch, Alberta department of agriculture. In it Mr. Jones states his opinion that, "Seldom do we see any evidence of extravagance in machinery purchases. Sometimes too little machinery is purchased to do an effective job." Mr. Jones' observations, MF believes, tend to substantiate the MF viewpoint that "false demand" is a false issue.

Advertising Expense

Some critics have suggested that advertising adds burdensomely to prices. The figures below show MF's 1966 Canadian advertising and sales promotion expense for farm machinery.

1966 MF Canadian Farm Machinery
Advertising and Sales Promotion Expense

Television	$345,000
Farm and Trade Journals	162,000
Sales Promotion	121,000
Product Sales Literature	68,500
FARMING TODAY	55,000
Point-of-Sale Advertising	9,000
Radio	8,500
	$769,000

Total Expense 1966	MF Canadian Wholesale Sales Net	Approx. Canadian Sales at Retail	Percent of Expense to Retail Sales
$769,000	$96.3 MM	$118.5 MM	0.65

These figures, taken one step further, show that the "advertising bill" to the farmer who purchased a $5,000 tractor last year was about $33. What did he get for his $33? Essentially, he got information which enhanced his ability to choose. Consider the following quotation:

> "The task of our...advertising is to give people exact information about goods on sale...and to explain their uses to the consumer....to give a truthful, exact, apt and striking description of the nature, quality and properties of the goods advertised."

In this, MF agrees with the writer, Anastas L. Mikoyan. Taking this thought one step further, and back to the capitalistic arena, MF believes that "informative" advertising sells more product, i.e., is more persuasive, than "persuasive" advertising. Certainly, it does the consumer more good.

With regard to advertising expense, it is interesting to note relative advertising expenditures in Canada. Data gathered on such subjects is generally not considered very accurate by the advertising industry itself. However, MF believes it is sufficiently accurate for the purposes it is introduced. The Elliot Research Report for the year 1965 which shows the 100 largest volume Canadian advertisers, lists only one farm machinery manufacturer. This manufacturer, however, is primarily an automobile manufacturer, and MF believes --especially in view of the absence of any other farm machinery manufacturers on this list-- that this manufacturer's farm machinery advertising expense was insignificant compared to its automobile advertising.

The 10 biggest advertisers, in descending order, were: an automotive company, a food company, a brewery, a soap company, another soap company, an automotive company (the one referred to above), a tobacco company, another food company, an air line and another tobacco company. These companies, with one exception, all market consumer items that many people use every day, and which, it might be argued, most people would continue to use every day even in the absence of advertising. Yet, the president of the parent company of the fourth company indicated above, has stated: "Time and again in our company, we have seen the start of advertising on a new type of product result in savings that are considerably greater than the entire advertising cost.... The use of advertising clearly results in lower prices to the consumer." This statement apparently refers to the economies of manufacturing and follow-on marketing expenses translated into lower prices. The same basic rule holds in the farm machinery industry: the higher the production volume, the lower the per-unit cost.

In all the ways mentioned --through continually providing information to farm publications, cooperation with independent experts, product brochures and information manuals, special articles, tours, films, training courses for company personnel and field demonstrations and advertising-- MF facilitates the flow of valid information of significance to the farmer.

MF does not claim that this is "technical" data in the sense the company assumes the word has been used by the Commission. But MF does believe

the information it provides is legitimate, meaningful --and, indeed, helpful-- to the farmer in his purchasing decisions. MF also believes that the provision of technical data to the farmer with reference to his own immediate farm's environment is a practical impossibility.

The practical usefulness of technical data to the individual farmer is also, in Massey-Ferguson's opinion, highly questionable. Would he, or could he, use it? If the farmer thought such information essential, someone --commercial agricultural publications or independent and disinterested, professional third-party groups perhaps-- would provide it. Basically, MF believes that such data are not meaningful to farmers. Even if they were, they should be certified and presented by a disinterested party to minimize confusion and increase acceptance.

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In summary, marketing must be viewed, particularly from the customer's standpoint, as "both ends of the never-ending loop". It is the marketing department which first concerns itself with determining the farmer's needs and then sets about materializing the hardware which will satisfy them. In a large industrial organization this demands nearly infinite series of interactions with other company departments. Product development, in its earliest stages, requires thorough coordination with engineering, manufacturing, planning and procurement, and the comptroller. The service departments, i.e., personnel and industrial relations,

management services and public relations, may volunteer suggestions or be called upon for special assistance at any time.

Marketing, perhaps more than any other department, is concerned with both the immediate and the long-term future. It must satisfy the customer today while planning for his satisfaction tomorrow. Engineering and manufacturing are essential allies in so doing.

Finally, since the natural focus of competition in the farm machinery industry is in the field, through its marketing department MF is highly sensitive to the necessity for and the precise requirements of a first-class dealership structure. The responsibility for the creation, maintenance and further development of such a structure rests with the marketing department. MF's practical philosophy, in a phrase, is that efficient, profitable dealerships are essential for satisfactorily serving the farmer.